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Fires Under The Signal Wires

In a recent investigation of a train accident resulting from a false-clear indication of an automatic block signal, the testimony brought out the fact that one of the contributing causes was defective insulation on the overhead signal wires. This, further investigation showed to be the result of burning ties directly under these wires, thereby charring the insulation and practically destroying its value. There are, of course, cases where a narrow right-of-way with lines of wire on both sides of the track give the trackmen little choice in the selection of a place for burning old ties, but this is the exception rather than the rule and in the large majority of cases there should be no occasion for building a fire in a location where it could possibly injure overhead wires. Practices such as this offer another means of distinguishing between the careful, thoughtful foreman and the careless, indifferent one.

Reduce the Waste

During the war campaigns to reduce waste in the use of materials as a means of enlarging the supplies available for the support of our military forces accomplished excellent results. Following the signing of the armistice, however, there was a letting down all along the line, with the result that many of the older practices have again appeared. There has therefore again risen a need for such campaigns, for not only is this waste resulting in enormous financial losses to many of the railways at a time when they are being sorely pressed on all sides, but it is actually curtailing the amount of materials available for use since deliveries of many materials are now being delayed greatly. The creation of waste benefits no one. It adds nothing to the wealth of the country, the employer or employee. If maintenance of way employees and their supervisory officers will make an effort to eliminate the wastes on their respective work, they will promote the interests of the roads which employ them in the most effective way with no loss to themselves. In fact, a far-reaching and universal campaign of this character will go far towards placing the railroads in a position where they can more adequately take care of their employees.

Traffic Density Increases Interference

The requirements of railway operation are such that forces working on the tracks and structures over which trains pass must reduce interference with traffic to the minimum. At the same time, these same conditions also make it necessary for these forces to suffer serious delays to their work, which interference frequently reduces their productive time to less than one-half of that spent on the job. The extent of this interference naturally bears a direct relation to the amount of traffic handled, for this in turn governs the number of trains operated. During the last four and one-half years the amount of freight handled has increased approximately 45 per cent and the number of trains has increased to only a slightly less extent. During the same period, the mileage of main tracks has increased very slightly, so that it is approximately correct to assume that this increased traffic has been handled on the tracks existing in 1916. Such an increase in the number of trains adds materially to the interference with forces working

on the tracks, and is another influence tending to reduce output and add to the cost of work. It is therefore another of the burdens on the maintenance officer.

NEW PHASES OF AN OLD PROBLEM

THERE IS NO question but that the problem of securing an adequate supply of labor is overshadowing all others in the maintenance department at the present time. Even with the restricted expenditures now authorized, the lack of men is the controlling factor in production. The maintenance of way department is the largest employer of unskilled or semi-skilled labor on the railways. It is therefore vitally interested in a number of influences affecting this situation which have recently appeared.

The importation of Chinese labor under suitable restrictions which was suggested two or three years ago is again being advocated and considerable interest is being attached to a movement which is being launched to bring about this result. While such an arrangement would relieve the present acute situation, the fact that it would be necessary for Congress to pass enabling legislation in the face of organized opposition from organized labor and from the western states and on the eve of a presidential campaign, leaves little hope for assistance from this quarter in the near future. As a counter measure, the immigration from Europe is now increasing rapidly, recently information being to the effect that the entrants are now arriving at the rate of 600,000 annually, and that the numbers are increasing so rapidly that they bid fair to reach the pre-war total of one million per year in the near future. Some slight relief is already being felt from this direction, and its effect will be more noticeable as this movement continues.

> We must restore personal efficiency, the sense of individual responsibility, loyalty to the job, and the standards of courtesy and service which existed among the rank and file of railway employees in former years. This will be a difficult task and I am afraid a slow one, but I have great faith in the American people. I think they are rapidly coming to realize that the present state of affairs cannot go on indefinitely, and that to get as much as possible for the least amount of work done only tends to aggravate instead of improve the situation. —*Elisha Lee*

Of even greater possibilities is the return of the labor now employed to its pre-war efficiency. In an article published elsewhere in this issue, Elisha Lee, vice-president of the Pennsylvania Railroad, sounds a note of encouragement in his statement that whereas it cost $4 in 1918 to secure the equivalent in track work for that which cost $1 in 1914, this ratio has fallen to $2.65 in the first six months of 1919. That this improvement has received an added impetus since the roads have been returned to private control is common knowledge.

The extent of the relief which may be expected from this direction is indicated by the recent experience of a manufacturer who, confronted with an output exceeding his ability to make deliveries, decided to curtail his production by making a 15 per cent reduction in forces. The following week he was surprised to find that his production had actually increased. A further similar reduction in force was made the following week, which again brought the same result. The self-evident explanation was that when the employees realized that their positions were endangered, each one exerted himslf to increase his own output as a means of holding his job, and a long step was made in the restoration of the old-time efficiency. Herein lies the principal solution for the labor shortage. When the men now at work realize that hight wages can only be justified by a corresponding output of work, and that conditions are returning to a normal basis in which the supply of labor will be equal to the demand, the problem will be solved. Until this condition is brought about, other measures such as the importation of men from foreign countries are only temporary expedients.

COMPETITION FOR LABOR

AMONG THE prime causes of the present labor difficulty is the policy of those industries which, being sujected to no limitations on the prices of their products, will pay unheard of rates for their labor. The effect is not only to attract men away from other employment, but to establish a standard of wage rates that the less fortunate industries are unable to meet. This subject has been of live concern to construction contractors who have suffered grievously from the ill-advised acts of some of their own number. Some construction contractors, on taking up work in a new locality, have shown an utter disregard for the agreements in effect between the local contractors and their laborers and in efforts to attain their own selfish ends they have ruthlessly destroyed established conditions. So serious is this condition that the Associated General Contractors' organization is bringing its influence to bear in the promulgation of general principles to govern its members in a more co-operative utilization of the labor available.

The interest of the railway maintenance officer in this situation lies in the question it raises in his own mind as to the possibility of the railways becoming a party to some such plan of co-operation. During a large part of the period of government control railway labor rates were subjected to regulations which had the effect of eliminating competition between the roads for the labor that was willing to work for the rates established. It did not, however, remove the competition with other sources of employment. At the present time while the extension of the agreement with the maintenance of way brotherhood will serve in some measure to eliminate competition bebetween the railroads, the roads will still be subjected to severe competition outside. Obviously, this condition is one which points to the need of some measure of co-operation between the roads and the contractors, particularly those who specialize in railroad work and employ men that come in direct contact with the railway employees.

SECURING RESULTS FROM LABOR-SAVING DEVICES

EVERY MAINTENANCE OF WAY man is more or less familiar with the reluctance if not actual animosity with which many section foremen and track men in general look upon new labor saving appliances. This has, of course, retarded the adoption of such appliances and

has also resulted in their being used in an inefficient manner. In some cases, the results obtained have been so discouraging both from the viewpoint of unit costs and the amount of work completed as to create a tendency to go back to the older methods. A number of railroads, however, knowing that the older methods are no longer practical under the conditions with which they now have to contend, have attacked this problem in a systematic manner and have had gratifying results. In the majority of cases an examination of existing equipment has disclosed the fact that such devices as tie tampers, rail drills, etc., were being placed in service with practically no instruction regarding their use outside of the books furnished by the manufacturer. It has also been noted that there has been no close follow-up of their performance in the hands of men unaccustomed to their use and of the care which was bestowed upon them. The result has been that, in some instances, the machines have been out of order as much as 50 per cent of the time, and even when repaired they have rendered insufficient service because of the lack of instruction and because of their run-down condition.

In an attempt to correct this, one road which has invested heavily for pneumatic tie tampers formed what was to all intents and purposes a separate department composed of men thoroughly versed in the efficient handling of labor-saving equipment. This force of men, or inspectors as they were called, makes regular trips over their territories, reporting direct to the engineer of maintenance of way on conditions as they find them. Their duties consist in giving complete instructions to section foremen and others on the best method of using and caring for the devices assigned to them. At the same tim ethey are able to check up on the condition of the machines, a factor which has proved to be a very important point.

Through this process it was discovered that the main cause for the failure or breakage of tie tampers was the lack of oil, this being the direct result of improper instruction in their use and maintenance. After this system had been in service a short time a distinct improvement was noted and, as it was continued, conditions gradually became better, resulting in an increase in the total amount of work performed with a corresponding decrease in the unit cost. While this is an important and much needed step which could be introduced on a large number of railroads, it can be carried a step farther by the addition of another duty for the inspectors. This would cover the co-ordination of the efforts of the men themselves, in the various stages of their work, in order to secure an increased output per man. While this would be somewhat difficult to do, it is not impossible, for considerable headway has already been made along this line with promise of more progress in the future.

Five Dollars For a Labor-Saving Idea

Have you developed or are you using a labor-saving device which is not generally known or used? Have you used any equipment for purposes other than those for which it was intended, and saved labor thereby? Have you an idea or plan of work which accomplishes the same results? In other words, do you know of a labor-saving kink? If it has helped you, the chances are that it will help other railway men. The crux of the maintenance problem this year is the supply of labor. Every man released by a labor-saving idea and thereby made available for other useful work, is a definite addition to the working force. The *Railway Maintenance Engineer* not only offers to present such information in its columns, but it will pay $5.00 for each meritorious idea or description of this character which is not generally known or used, and which has not been described previously in these columns or elsewhere. Send such contributions to the editor, 608 South Dearborn Street, Chicago.

LETTERS TO THE EDITOR

REDUCING WATER WASTE*

Oak Park, Ill.

TO THE EDITOR:

The railroads of this country consume about two billion gallons of water per day. This is approximately 8,000 gal. per day per mile of railroad. The best data available indicates that as low as 2,000 gal. per day is consumed per mile on some of the branch lines, and as high as 10,000 gal. per day per mile on main lines.

Based on an average consumption of about 8,000 gal. per day per mile a railroad 5,000 miles long would consume40,000,000 gal. per day. The average cost of this water is not less than five cents per 1,000 gal., which amounts to $2,000 per day, or an annual expenditure of $730,000.

It has been estimated that one of the largest cities of this country wastes about 50 per cent of all of the water pumped, but the waste on railroads is probably lower. Recently the Illinois Central, by means of a water waste conservation campaign, reduced the expense of its city water for the entire railroad 18 per cent, amounting to an annual saving of about $34,000. Many railroads furnish at least 80 per cent of the water that they use, the other 20 per cent being purchased from municipalities. Assuming an actual saving of 18 per cent, the total saving that could be obtained by a railroad of 5,000 miles would be $131,400 per year. It seems safe to say that at least 10 per cent can be saved, or $73,000 per year.

It seems to be the general opinion among railroad employees that the water furnished by railroads is plentiful and the cost, therefore, is not given much consideration. The question as to how the waste of water can be eliminated and a large saving made is, of course, of first importance. A large portion of the entire waste of water occurs at large engine terminals.

The following notice gives an idea as to how part of the waste occurs:

WATER WASTE CONSERVATION CAMPAIGN

HOW YOU CAN HELP

(1) Report promptly to the management all water leaks. This will be appreciated.

(2) Have all leaky pipes and fixtures repaired immediately, and keep them in good order.

(3) Do not neglect leaking toilets, faucets and valves. These should be kept in repair.

*See the article by C. R. Knowles on page 217.

(4) Do not fail to have all water columns and pits inspected frequently and all leaks eliminated.
(5) Do not allow an excess quantity of water to be used for cooling compressors or oil engines.
(6) Do not allow engine tenders or storage tanks to overflow.
(7) Do not allow improper use of hose in sprinkling or for washing locomotives and coaches.
(8) Do not allow hyrdants to be used for drinking purposes.
(9) Be sure that all valves in roundhouses and shops are turned off when not in use.
(10) Try to reduce the water consumption at all terminals by eliminating water waste.
Be Saving—Avoid Waste.

An effort should be made to impress upon all employees the necessity of saving water, especially at the engine terminals. The employees' magazines might be used to advantage in this respect. Printed notices, framed and hung in all enginehouses and at other points where a large quantity of water is used, will assist in the elimination of waste. Circulars, explaining in detail how to avoid wasting water, might be of value. At many places the price paid for water has increased as well as the cost of furnishing water by railroad forces and this in itself, if there had previously been no waste, would call for increased vigilance. If the employees' attention is called to this matter in a proper way, I believe that they will be willing to assist the railroads in reducing the use of water.

The apparent neglect of railroad water supply is probably due to the fact that within a comparatively few years this department was not considered of any importance, as the quantity of water required was not great, and the quality was given little, if any, consideration. Conditions have changed with modern railroad operation, calling for careful, intelligent consideration of the many problems involved.

Providing water for locomotives and for other railroad purposes is a feature of railway operation that should be given more consideration. Many of the larger railroads have provided special organizations for handling water supply problems, and the results have paid for the organization several times over. An organization of this kind could, as part as its duties, investigate and study the water waste and make recommendations for its elimination. The engineering departments can, no doubt, render valuable service in the reducing of water waste and improving the water service in general.

F. D. YEATON.

AN EASY WAY TO BREAK RAIL

Goodwater, Ga.

TO THE EDITOR:

The May issue of the *Railway Maintenance Engineer* contains a letter on the use of track chisels and rail cutting by J. A. Morris to which I must take exception. He says that in using chisels for driving rail one invites bad rail ends. I do not approve of driving rail with a chisel except in certain cases, but if it is used on the side of the rail head and not on top no ill effect is apparent, and this process drives the rail the same as if the chisel had been placed on top of the ball. I cannot agree with Mr. Morris that his method of cutting a rail is the best, although it is good and probably much better than those commonly followed by the foremen over the country.

We use a method that does not require even the light cutting across the base advocated by Mr. Morris. To cut a rail that is out of track we secure two blocks six inches thick, put one of these blocks under each end of the rail that is to be cut and up by the side a rail in the track. Turn the rail on its side with the base toward the track rail and use four men with bars to spring the rail down, catching their bars under head of the rail in the track and over the rail to be cut. Spring the latter down hard and set a track chisel on the edge of the rail base at the point to be cut and have one man hit it two or three blows (not more than four), thus nicking the flange on the edge. Then turn the rail over and press down as before and set the chisel exactly even with the nick on the opposite side and hit it. Usually one blow breaks the rail in two, which means that only three or four licks with the hammer are required for the entire operation, and in all cases it gives a cut that is as smooth as if sawed. If the piece to be cut is short a piece of rail can be jointed on so as to give the bending necessary in this method of cutting rail. To cut a rail without taking it out of track, the same principle is used with the same results. Never cut any part of the ball nor any other part of the flange than that mentioned, as it is a waste of time and results in an uneven break. With this method we eliminate the use of a rail bender and the several blows required to cut across the base of rail and last, but not least, we save a lot of time.

J. MORGAN,
Supervisor, Central of Georgia.

CRUDE OIL ARRESTS CORROSION

Pittsburgh, Pa.

To the Editor:

I am employed on a bituminous coal road, that is, bituminous coal is the only sort hauled and burned in the locomotives. Therefore, anyone familiar with this situation can understand what we have to contend with in maintaining our steel bridges. We have not been slow in trying to combat the ravages of rust and have used the very best of men and materials to protect the steel structures but have met with only partial success.

I note in your issue of February a letter to the editor discussing sand blasting and chipping. From my point of view the sand blast is not in the running; we will always do the chipping, whatever the mode of treatment for rust, but up to this writing it seems that we are fated to follow the same old ways and means that we have used since the steel bridge was introduced.

Many years ago we received instructions that, "When painting all steel bridges, clean the rust parts until the bright metal shows and then soak these parts with crude carbon oil, allowing it to remain for 24 hours, then wash off all the oil with benzine and do not apply any paint until the spots are thoroughly dry." We carried out these instructions to the letter and then coated the spots with red lead. After a time I examined the washed-out spots and I found that the rust was still at work under the lead. The crude oil idea was all right, but the method of getting it out of the deep rust pits was wrong. I was granted permission to try a scheme of my own and, selecting a bridge that was a fit subject, I followed the procedure as stated, but I burned out the crude oil with my gasoline painter's torch and while the steel was warm, coated the spots with carbon black with about 10 per cent zinc (chromate) added, and I can say the rust never made itself visible again.

With the facilities of today, namely, the oxy-acetylene torches or possibly the gasoline snow melters, I firmly believe that it would be possible to get 90 per cent protection by this means. The seat of the rust must be reached —get the oil ahead of the rust and then get the oil out.

Of late, red lead is strongly advocated. For shop work before the steel is exposed it has my hearty endorsement, but for field work I prefer the oxides or carbons.

FOREMAN OF PAINTERS.

RESULTS OBTAINED.—During the 13 years that the Atchison, Topeka & Santa Fe has conducted an apprentice system in its mechanical department, 200 men who completed the course have been promoted to supervisory positions.

IT PAYS TO SAVE WATER

How the Illinois Central Has Reduced Its Outlay for This Purpose by Eliminating Waste

BY C. R. KNOWLES,
Superintendent Water Service, Illinois Central, Chicago

WHILE MUCH has been written upon the subject of water waste and the possible economies to be effected through waste prevention, such information has been largely estimates of probable savings. The information given in this article is from actual results of reducing water waste on the Illinois Central system during the past five years, showing a saving of $65,000 per year through the prevention of waste alone.

The consumption of water by the railroads of the United States is roughly 900,000,000,000 gallons per year and the cost will average over 7 cents per thousand gallons, or a total annual expense of more than $63,000,000. A reduction of 20 per cent through prevention of waste is easily possible; this would mean an annual saving of $12,600,000.

THE COST OF WATER NOT APPRECIATED

Unfortunately these figures mean but little to the average employee, as most people have become accustomed to regarding water as being of no value. Thus they waste water because it is water and in their eyes represents no particular value. If instead of water actual dollars and cents were escaping from the many outlets there would be no water waste problem. The difficulty encountered in preventing water waste lies in the fact that the average user cannot understand why anyone should worry about water with the innumerable lakes and rivers on and adjoining the right of way. He cannot appreciate the fact that back of the faucet and spout are costly pumping stations, large reservoirs, water softening plants, thousands of tanks and hundreds of miles of piping necessary to store and convey the water to the point of use.

The writer has been conducting a water waste campaign on the Illinois Central system for the past five years, endeavoring to impress upon employees and others the value of water and the importance of water waste prevention. It is gratifying to know that results are being obtained and a material reduction made in the consumption and cost of water.

In order to arrive at the saving accomplished through prevention of water waste a comparison has been made of the consumption of water at 14 of our largest city water stations, representing 70 per cent of the total consumption and 62 per cent of the total cost of city water, taking 1914 (the year in which the water waste campaign was started) as a basis, compared with the five years ending December 31, 1919.

A statement is submitted, herewith, showing the decrease in city water consumption during the five-year period 1915 to 1919, inclusive:

	Gallons	*Amount*
Chicago	587,455,000	$36,448.58
Hawthorne, Ill.	7,055,600	705.56
Effingham, Ill.	5,832,200	422.30
Centralia, Ill.	537,663,100	24,194.85
Cairo, Ill.	73,588,440	4,409.66
Mounds, Ill.	139,611,500	3,983.53
East St. Louis, Ill.	87,015,890	5,038.75
Paducah, Ky.	182,218,400	9,550.88
Louisville, Ky.	209,824,800	9,388.50
Central City, Ky.	9,640,450	497.49
Memphis, Tenn.	388,833,400	38,883.34
Canton, Miss.	51,632,050	2,524.48
Jackson, Miss.	4,637,000	253.24 (inc.)
New Orleans, La.	5,138,000	359.66 (inc.)
	2,270,595,830	$135,435.02

This statement shows that the waste and unnecessary use of city water was decreased 2,270,595,830 gal., thereby showing an actual reduction on the face of the bills of $135,435.02. During the same period the average increase in tonnage handled amounted to 28 per cent. This increased the consumption of water at least 10 per cent, reflecting a further saving of $131,420.13. During the same period the water pumped by company forces was reduced 5 per cent, which at 2 cents per thousand gallons effected a further saving for the five-year period of $60,038.80, a total saving of $326,893.95 in five years, or an average saving per year of $65,378.79, nearly $200 per day.

There is nothing extraordinary in the saving shown above as the same results may be accomplished on almost any railroad, and while this is a creditable showing there is still material room for improvement. The opportunities for saving money through water waste prevention are greater than ever before, as the cost of water at many points has materially increased.

KEEP THE SUBJECT BEFORE THE EMPLOYEES

So much has been said on the subject of water waste that it would seem that every railroad employee should be familiar with the importance of economy in the use of water, yet it is a fact to be regretted that the average employee seems inclined to establish a reason for the increased cost of water rather than to put forth the same effort in locating and correcting the waste. The results on the Illinois Central have been accomplished through a vigorous campaign against waste, constantly keeping the importance of the subject before officer and employee.

The greatest saving was, of course, made through the reduction in consumption and cost of city water and the principal efforts were directed toward correcting waste through those facilities supplied with water purchased from outside parties. In order properly to check the consumption and cost of all water purchased each bill for water was carefully checked. To facilitate the checking

and handling all water bills are entered on a card index showing the period during which water was consumed, the gallons purchased, the rate per thousand gallons and the amount of the bill.

By establishing a card index system for city water bills, each month may be checked readily with previous months as well as with the same months of the previous year. Both sides of the card are used, each side being good for one year's record. Different colored cards are used to indicate each grand division, with an index card to show the division, the name of the station being shown on the tab of each card. Any increased consumption is noted and an explanation is requested from the officer having jurisdiction over the use of water at that station. If the increase cannot be justified a water waste survey is made. Invariably such a survey shows the increase to be unnecessary and discloses the source of waste.

ADDITIONAL PUMPS NOT NECESSARY

As an example of conditions found in these water waste surveys a few instances may well be cited. At a large terminal a request had been made for an expenditure of approximately $18,000 for new pumps and pipe lines and it was stated that the old pumps and pipe lines were too small to furnish sufficient water. A water waste survey disclosed the fact that approximately 40 per cent of the water pumped was being wasted. When these conditions were corrected the pumps were found ample to handle the supply without any expenditure for additional equipment.

At a large office building the city water bill had increased to $440 per month, and as this appeared excessive a water waste survey was made, with the result that the monthly bill was cut to $116, a decrease of 75 per cent. The causes for waste at this point were due to the control valve on the feed water heater not operating properly, allowing city water to pass through the heater to bilge tanks, from which it was pumped to the sewer. It will be noted that this waste caused a threefold loss: (1) The cost of city water. (2) The loss of the coal required to heat the water, which at the time investigation was made was estimated to be the equivalent of 250 b.h.p. (3) There was an additional loss of electric current required to pump the water from the basement level to the city sewer, the bilge pump operating every 50 seconds at the time the investigation was made.

In addition to this heavy waste the urinal tanks were found to be flushing at intervals of from 50 to 70 sec. As there were 18 of these tanks in service, each tank being of the 3-gal. flush type, it meant that 2,000,000 gal. per month were required to flush these tanks at one-minute intervals, or seven to eight times as much water as required. In addition, there was waste from house tanks overflowing and other minor waste of hot and cold water in the restaurant and other points in the building.

At a large engine terminal the automatic valves in the boiler washing system were in such condition that the daily consumption of water was approximately 300,000 gal. per day. Upon adjusting these valves the daily consumption was decreased to 80,000 gal. At another point the consumption was decreased nearly $300 per month by adjustment and correcting automatic valves controlling the inlet to the feed water heater and boiler washing system. In this case the saving in heat units was greatly in excess of the cost of the water wasted.

Numberless other instances could be cited where material economies have been effected through intelligent water waste surveys, these being merely given as examples. The opportunities for water waste on railroads are many and it is within the power of every employee to save money by practicing economy in the use of water, not in the economy that stints, but in the economy of reasonable use.

SOME HUMAN FACTORS IN RAILROAD EARNING POWER*

BY ELISHA LEE,

Vice-President in Charge of Eastern Region, Pennsylvania Railroad, Philadelphia, Pa.

IN 1915 RAILROAD WAGE and labor conditions were about what we used to call "normal." In that year the average wage paid per man in the operating department, on the portion of the Pennsylvania System which we used to call the "directly operated lines" (that is, the lines between New York and Washington, and Philadelphia and Pittsburgh, with their branches) was something less than $840 per year. By the opening of 1920 this had risen to a rate of nearly $1,600 annually. The average wage per employee had practically doubled. Meanwhile, the number of operating employees (excluding the executive forces at Broad Street station) had arisen from an average in 1915 of 126,000 to 165,000, or 31 per cent, while the total payroll jumped from $105,000,000 in 1915 to $240,000,000 in 1919. The entire cost of rendering service, due to the two factors of higher wages and more men, had thus increased nearly 2½-fold.

During 1915, for every dollar of operating pay-roll we carried an average of 231 tons of freight and 24 passengers one mile, a total of 255 traffic units. In 1919, for each dollar of operating pay-roll we carried an average of only 115 tons of freight and 19 passengers one mile, a total of only 134 traffic units. The productive power of the dollar, spent in railroad wages and measured in transportation service rendered, had fallen 47½ per cent.

In 1915, for each ton of freight carried one mile we received 6.35 mills and spent in rendering the service 4.45 mills. We thus had a profit of 1.9 mills for each ton-mile. During 1919 our average gross revenue had risen to 8.96 mills per ton-mile, but the expenses had jumped to 8.68 mills, so that we had a profit of only a little bit better than ¼ of a mill for each ton of freight carried a mile.

In 1915 our passenger service produced a gross revenue of 1.996 cents for each passenger carried one mile, and the expenses were 1.735 cents, making a net profit of 2.61 mills. In 1919 gross revenues averaged 2.458 cents per passenger-mile, while expenses had risen to 2.216 cents, leaving a net profit of 2.42 mills for each passenger carried one mile.

Before the era of war wages we used to figure on paying trackmen about $1.75 per day. Now we pay trackmen about $4.50 per day, figuring in both cases upon 10 hours of duty. We know, not by guess-work, but by actual facts, that the average efficiency of trackmen in the last four years has decreased over 40 per cent. This has been ascertained by repeated observations of the amount of work done by them in renewing rails, ties, ballast, etc.

A study of this which was completed last fall, and which was based on the actual cost of track work done on the Lines East of Pittsburgh during the five years from 1914 to 1918, showed that, in considering the amount of track material applied, with the number of men employed and the number of hours consumed, at the close of the period wages per man per hour were doubled, while it required twice as many men to do the work. In other words, where the railroad paid out $1 in 1914 for accomplishing a certain unit of track work, it paid out $4 in 1918.

A marked improvement has been shown in track maintenance work since the beginning of 1919. For the first six months of that year, which is the closest that this particular study has been brought up to date, we found that

*Abstracted from an address delivered before the Philadelphia Chapter of the American Institute of Banking on April 9, 1920.

where the $4 was paid out in 1918, it was then only necessary to spend $2.65 to have the same unit of track work done. That is very encouraging, and I believe we are going to continue to improve in this right along.

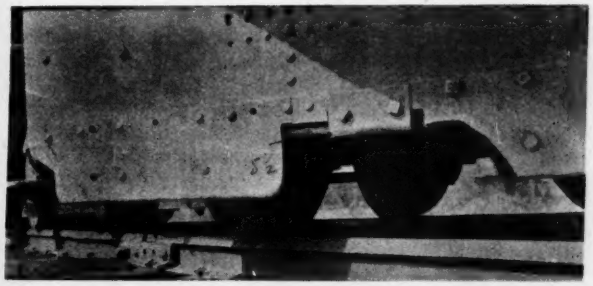
We must restore personal efficiency, the sense of individual responsibility, loyalty to the job, and the standards of courtesy and service which existed among the rank and file of railroad employees in former years. This will be a difficult task and I am afraid a slow one, but I have great faith in the American people. I think they are rapidly coming to realize that the present state of affairs cannot go on indefinitely, and that to get as much as possible for the least amount of work done only tends to aggravate instead of improve the situation.

On the whole, I believe an attempt to lower the existing scale of wages under present conditions would be unwise and unjust, and it may even be that there are still some cases in which the employees are not being paid enough. We could stand the existing wage levels if we had the old-time loyalty and personal efficiency. And if the promised increase in efficiency that we were told would come with higher pay and short hours had actually been realized, we would be living in a sort of transportation Utopia. But, as I have said, neither of these things has yet come about.

In regard to further wage increase for railroad employees, I wish to make my position clear. I am not an advocate of any movement to reduce wages. The present law provides, however, through the Railroad Labor Board, that general increases of any moment shall not be made unless with the concurrence and uncoerced consent of the general public, which in the end pays all the bills of railroad operations, whether under Government management or private management.

Converting Winter Equipment for Maintenance Work

THE INCREASING need for the conservation of labor is bringing out many new ideas regarding the utilization of existing equipment for that purpose. This is being accomplished in most instances by making additions or slight changes which have the advantage of rendering the equipment available for a wider range of work and thus keeping it from being idle a large part of the year. One of the most recent of these changes is the modification of snow flangers by the Pennsylvania



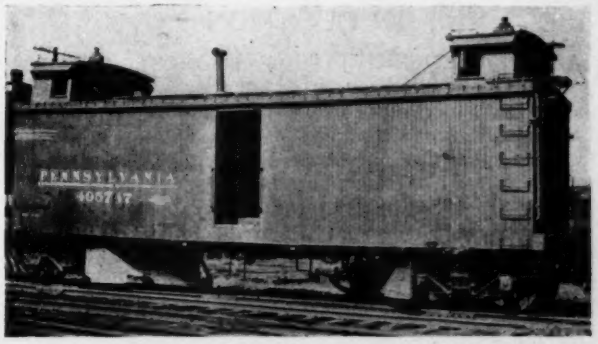
Showing the Slot Over the Rail and Hardened Plate

in order to employ them as ballast spreaders where light raises in track are necessary. Up to the present time 10 out of about 65 flangers on the road have been changed over, the work on the others following as quickly as it can be performed.

In the main, the changes in the snow flangers have been minor in character and consist of a new nose-piece for the plow with considerably less curve to it, the addition of two surface-hardened steel plates to ride the rails and a general reinforcement of the entire plow. Two plows are used on each car, so mounted on the trucks of a standard box car that they face each other. These are controlled by air-lifts installed in the car and controlled from two cupolas by the operator. The illustration shows both the general arrangement and the chief difference between the plows for snow flanging and those for ballast spreading. The one shown on the right has a long upturned nose-piece and is used for snow flanging, while the one on the left is used for ballast spreading. In general practice, however, both plows are being remodeled so that the car can be moved in either direction, whether levelling ballast or flanging snow. In winter use the plow is operated at a speed of about 15 miles per hour and is raised slightly in order to insure ample clearance between the nose-piece and any high ties which may be in the track. In spreading ballast the plow is held down firmly on the rails by air pressure in order to eliminate the possible chance of derailment, due to the action of ballast under the wheels. As the car is not operated faster than four miles per hour in ballast work, any slight riding action of the plow on high ties is neither dangerous nor detrimental.

The plow itself consists of two heavy ¾-in. sheet steel plates approximately 7 ft. 4 in. long, set on an angle of about 45 deg. with the center line of the car and backed or reinforced with 2-in. oak planking. At the point where the blades cross the rails a slot about 20¾ in. long has been provided which gives an opening perpendicular to the rail of about 13 in., and is so spaced that the inside edge is 5 in. from the gage side of the rail. The bottom edge of the blade is flared slightly in order to facilitate the lifting of ballast or snow over the rail. The top of the slot is faced with a hardened steel plate bolted to the plow, the total depth of the slot being five inches.

The joint of the two flangers has been strengthened with a nose-piece, which consists primarily of a curved bar



Snow Flanger Equipped as Ballast Spreader

2 in. by 2 in. in size, which extends from the top of the "V" down to a point approximately 16 in. in advance of the base and then back to the lower edge of the joint. This is reinforced on the bottom by a 2-in. by 2½-in. specially formed bar, which is given a slight upward curve. The two wings are braced by a heavy bar extending across the plow and located at the center of gravity. All the thrust is carried by the trucks of the car, the plow being attached to each forward journal box by means of two U-shaped strap-iron bars, 4 in. wide and 1 in. thick, which are bolted to the top and bottom of the journal boxes.

These irons each carry a 1 9-16-in. hardened steel pin, which engages with a 10-in. slot in a heavy guide bracket, riveted to the flange plates.

Each plow is operated by means of two opposed air cylinders mounted along the center line of the box car and using the same piston rod to which two 18-in. bell-cranks are connected. These, in turn, are connected to two lift-rods extending down through the floor of the car to the plow. The total maximum vertical movement obtained by the air-lift is 9 in., which is arranged so that

Typical Results Obtained With Converted Flangers

when the plow is at its lowest point the bottom edge is 5 in. below the top of rail. This gives a clearance of about 4 in. when the plow is raised, which has proved to be sufficient under all circumstances. In order to limit the stroke of the cylinders and thus limit the depth to which the plow could be lowered for snow flanging, special plates were bolted to the foundations of the air cylinders which act as stops, preventing the bell-cranks from moving beyond a certain point. These plates represent the only change necessary to convert the plow from a snow flanger to a ballast spreader.

MAINTENANCE OF L. R. & N. TRACKS IN QUESTION

AS STATED BRIEFLY in last month's issue, the Louisiana Railway & Navigation Company was fined $1,000 for failure to comply with the order of the Louisiana Railroad Commission requiring that company to "repair and place in a safe and satisfactory condition its entire roadbed, including switches, cross-ties, rails, bridges, frogs, trestles and any and all portions of said railroad by replacing such defective material as may be necessary, and renewing such parts of bridges and tracks as may appear to be in an unsafe condition," within a period of 120 days. In addition, the Commission has required the payment of $100 a day for each day after March 30, during which the company shall fail or refuse to comply with this order.

The following is a statement by R. E. Milling, general attorney of the Louisiana Railroad & Navigation Company, concerning the position of the railroad:

"About a year ago, the Louisiana Railroad Commission notified the Louisiana Railway & Navigation Company to improve its tracks. Similar notice was also issued to other railroads even though at that time unprecedented rains had prevented in part the maintenance of track in the ordinary way. At the time the Commission's request to improve the track was received, the president of the railroad had already issued instructions to the immediate managers in charge of the property, and while continually hampered by excessive rainfall, the property was improved in all directions.

"Gravel ballast was distributed in larger quantities than ordinary maintenance required. Over 170,000 ties were placed in the last year under the track, which amount is more than double the number ever placed in any one year. Bridges and trestles were repaired and painted, stations were also repaired and painted and several new structures were erected where it was deemed necessary. The motive power was given a general and thorough repair, as well as the coaches and freight cars. This resulted in increased business, both passenger and freight. The extra large amount of work done in the past year can be testified to by many of the best business men and planters along the line of the road.

"The statement that the tracks of the company are not in safe condition is not well founded. The Louisiana Railway & Navigation Company has a record second to none in the matter of safety. During 22 years of operation not a passenger was killed, and none of them hurt, unless very slightly, and in 22 years not one trestle collapsed under the traffic, which at times was very heavy. Of course, there have been derailments, but no railroad in operation can eliminate derailments entirely, because derailments are sometimes occasioned by outside interference with tracks.

"Statements in the press, apparently sanctioned by the Railroad Commission of Louisiana, are unjust and unfair. South Louisiana, and especially the southwestern part, near New Orleans, from August, 1918, to August, 1919, had more than 100 in. of rainfall. It was almost impossible to maintain properly the track, but the Louisiana Railway & Navigation Company performed that service as well as any other road in the same section similarly situated, and this publication was issued and a fine imposed without any further notice to the company or giving it an opportunity to be heard."

DATA ON MAINTENANCE EMPLOYEES

THE TABLE BELOW is abstracted from information issued by the United States Railroad Administration showing the number of railroad employees, their compensation and the number of hours and days worked. The condensed form below is restricted to classes of employees, all or a part of whom are in the maintenance of way and construction departments. The total for the complete table covering all employees showed that the number for the month of January, 1920, was 1,953,571, as compared with 1,871,035 for the same period in 1918. The total compensation paid these men for the month of January, 1920, was $258,290,393. This is equivalent to 57.1 cents per hour for the men on the hourly basis, or $5.15 per day for all who were on a daily basis.

EMPLOYEES AND THEIR COMPENSATION
MONTH OF JANUARY, 1920. COMPARED WITH SAME MONTH OF PREVIOUS YEAR

Class of employee	Number of employees		Hours worked		Days worked		Compensation 1920		
	This year	Last year	This year	Last year	This year	Last year	Amount This year	Per hour This year	Per day This year
Assistant engineers and draftsmen	10,024	10,817	.....	.....	267,988	291,335	1,551,249	....	5.79
M. W. & S. foremen (excluding Nos. 10 and 26)	8,048	8,043	.....	.....	222,351	231,546	1,282,998	....	5.77
Section foremen	40,822	40,513	.....	.....	1,155,058	1,169,638	4,699,419	....	4.07
Section men	250,003	254,306	52,807,378	57,900,647	.....	.....	20,007,165	.379	....
Foremen of construction gangs and work trains	1,542	2,209	354,270	494,505	.....	.....	211,595	.597	....
Crossing flagmen and gatemen	22,741	21,692	.....	.....	677,942	675,548	1,791,671	....	2.64

Railroading Here and There

CROSSING THE CANADIAN ROCKIES

The Two Portals of the Spiral Tunnel at Field, B. C.

Train Emerging from the Five-Mile Connaught Tunnel in the Selkirk Mountains

Another View of the Spiral Tunnel

In Kicking Horse Canyon

The Lethbridge Viaduct

WHY TIE RENEWALS VARY FROM YEAR TO YEAR

Two Independent Investigations Bring Out Correlative Data on This Important Subject

THERE HAS BEEN a general understanding that tie renewals on a new line come in cycles having a period related to the average life of the ties used and that the intensity of this fluctuation in renewals gradually subsides with each recurrence of the cycle, although it is a long time before these renewals approximate uniformity from year to year. However, these ideas are rather vague in the minds of most men who, while realizing that there is a certain amount of fluctuation in the normal renewals, have been in possession of but few tangible data regarding the actual nature of these variations.

In view of this, it is of peculiar interest to note that two independent studies were made recently which throw considerable light on this subject. These studies were undertaken for different reasons and approached the subject from entirely different angles. The one by Lowry Smith, assistant district engineer, Northern Pacific, St. Paul, was presented before the recent convention of the American Wood Preservers' Association and is the result of a study to demonstrate the effect of using treated ties with the idea of correcting some misinterpretations of data on tie renewals obtained in cases where treated ties have been in use for several years. The other paper, that by S. S. Roberts, consulting engineer, Louisville, Ky., is the result of a study of the problems encountered in connection with his work with the United States Railroad Administration on the relation of tie renewals during the test period to those during the period of federal control. His conclusions also are developed along those lines.

Mr. Smith's diagrams were constructed on rigid mathematical calculations from data developed by the United States Forest Products Laboratory. Mr. Roberts' curves, on the other hand, are based on a general study and observation covering several years. Each study is complete in itself, but the two follow such parallel lines that it was thought best to present them together.

The Relation of Tie Renewals to Depreciation

By S. S. ROBERTS,
Consulting Engineer, Louisville, Ky.

IN THE THOUGHT of many practical trackmen is the misapprehension that the annual cross tie renewals should be the quotient obtained by dividing the total number of cross ties in the track by that number which represents the averaged life of the cross ties in years. Some engineers, too, are of the same mind. Many others have accepted the thought with the reservation that the conclusion is true after a railroad or a piece of track has reached a certain age, but the age when renewals become uniform has always been vague and the probability is that it has generally been set at a time long before uniform requirements will prevail. In consequence, beyond a tendency to cause errors in making renewals, mistakes have been made in the consideration of depreciation. In all methods proposed for comparing the economic merit of two or more cross ties of different kind, price and life, the averaged life of the cross ties was the uncertain quantity. Naturally, under the premise, the efforts of engineers in the past have been largely directed toward the determination of averaged life.

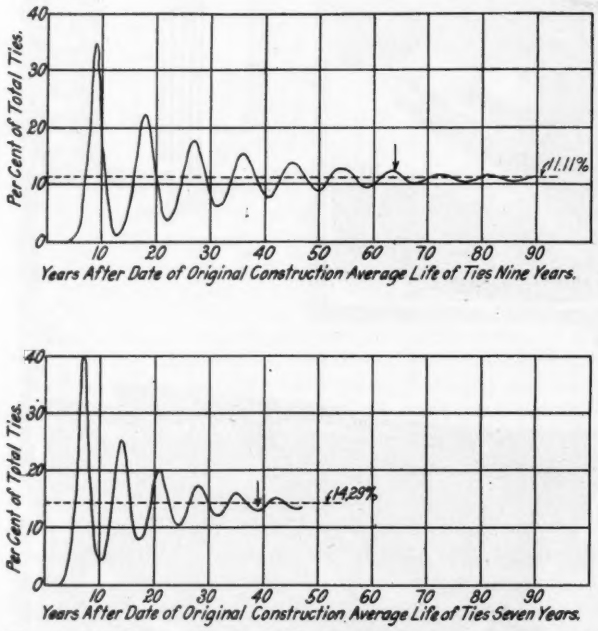


Fig. 1—Indicated Required Tie Renewals in Per Cent of Total Ties in the Track

After the cross ties have been selected and put in the track, the performance of the individual tie becomes more important than that of the averaged whole. To forecast the annual renewal requirements it is necessary to know not only the averaged life of the cross ties, but also the number of years after installation until the first failures, the number then to be expected and the number of failures which may be expected each year thereafter until all of the original cross ties have been replaced.

The indicated required cross tie renewals, shown in the curves of Fig. 1, are based on the best information accessible to the writer, which includes consideration of reports of tests, observation and discussion with trackmen. The general assumption is made that as many of the original cross ties will remain in the track after the year representing the averaged life of the cross ties, as were taken out before that year and that the renewals will be symmetrical with respect to that year.

Several opportunities were had for checking past records and existing field conditions against the indications obtained from the curve for cross ties with averaged life of nine years. The results given by the records, combined with the field observations and those taken from the curve, were in such reasonable accord that it is believed that this curve is a fair approximation of facts.

The curve for ties having an averaged life of seven years was computed during the past few days and has not been compared with actual conditions. Without doubt the form of the curves in Fig. 1 is the form which will be

developed when results of a number of definite tests are available. The probability is that the curves here shown will closely approximate the curves finally determined.

The curves show that a condition of absolutely uniform cross tie renewal requirement will never be reached. In the following, when the maximum and minimum renewal requirements shall each vary less than one per cent from the uniform requirement, the quantities are here considered to so closely approximate uniformity as to be practically uniform.

For a section of track constructed during a given year with cross ties which have an average life of nine years, uniform renewal requirements will be reached after the sixty-fourth year after the year of original construction. For cross ties having an averaged life of seven years, after the thirty-ninth year, and for cross ties having an averaged life of five years, the renewal requirements will probably become uniform between the twentieth and twenty-fifth year after the year of original construction.

The effect of different periods of construction for separate sections of a railroad on the time between the original construction of the first section and the time when the renewal requirements may become uniform for the railroad taken as a whole, cannot be estimated unless the time of construction, length and all conditions of each section be known. Nothing in particular would be gained by such an estimate. The computations for each section would have to be made separately and combined just as in practice each section must be separately maintained.

However, assuming certain abstract combinations the following results were obtained:

All sections of equal length. Averaged life of cross-ties nine years.

Number of sections constructed.	Number of consecutive years of construction.	Time in years after construction of first section until requirements are uniform.
1	1	64
2	2	64
3	3	64
4	4	56
5	5	56
6	6	47
7	7	40
8	8	27
9	9	10
10	10	21
11	11	32
12	12	33
13	13	38
	One constructed each second year for years.	
2	2	60
3	4	52
4	6	37
5	8	26
6	10	36
	One constructed each third year for years.	
2	3	52
3	6	18
4	9	40
5	12	38
	One constructed each fifth year for years.	
2	5	33
3	10	51
4	15	28
5	20	42

If now, as in actuality, the sections considered had been of unequal length, constructed at haphazard times and of different kinds of ties, an expression as to the time when the cross tie renewal requirements for the line as a whole will become uniform, would be highly speculative, without long and tedious computations.

A common legend among trackmen is that in the past when timber was plentiful along all railroads and cross ties and labor were the cheapest things to be had, the section foremen were permitted to put in cross ties when, where and in the number which they desired and in consequence greatly lessened the time until the renewals required became uniform. Had this been a fact and had the foremen put in each year the number of cross ties given by dividing the total number by their averaged life, then after that number of consecutive years represented by the averaged life of the ties, the renewal requirements would have become uniform.

Reports do not bear out such a claim when applied to any well managed railroad which was constructed in the past 30 years. Observation clearly shows that on well managed railroads which were constructed within the last 20 years, the cross tie renewals have been given very careful attention and the renewals permitted have been

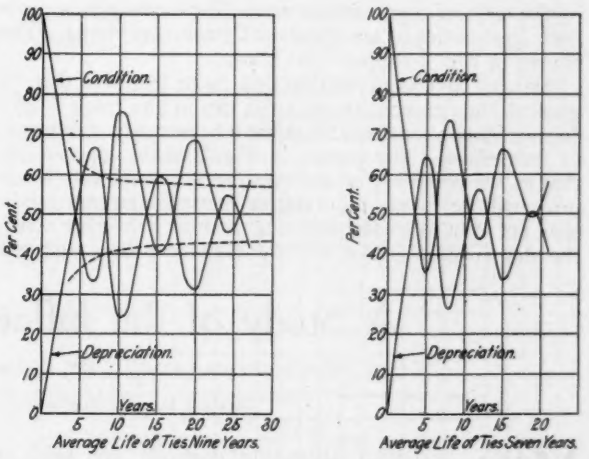


Fig. 2—Condition Per Cent and Depreciation Curves

determined by the independeit insuection of at least two experienced trackmen. The renewals have, therefore, closely approximated the renewals which were actually necessary and are those upon which, as far as possible, the data for the accompanying curves are based. Experience would indicate that during the past 20 years there has been a tendency rather to undermaintain temporarily. Such practive was simply piling up "the wrath to come," for after a few years very heavy renewals would be imperative to get back, if not to normal, at least to conditions of safe maintenance. It seems more probable than otherwise that by this practice the time for reaching uniform renewal requirements was increased.

The reasonable conclusion is that for many years after the original construction the annual cross tie requirements will vary widely from year to year and that for any given section of track, which has been reasonably well maintained with a uniform class of cross ties, the annual renewal requirements will be dependent upon the time since construction rather than upon the averaged renewals of any short period. The evident variation in renewal requirements of itself suggests that the depreciation and conversely the condition per cent will likewise vary and will not become uniform until the renewals become so.

Computing the straight line depreciation on cross ties put in in accordance with the curves in Fig. 1, the depreciation and condition curves in Fig. 2 were obtained. These curves prove how impossible it is to assume any average value for depreciation and condition which will even approach the facts, and also how incapable any one would be of inspecting a piece of track and then stating offhand what these conditions should be. Take, for instance, the curve in Fig. 2 for nine-year average life.

For the first seven years after construction the depreciation increases from 0 to practically 66.9 per cent; at 10 years it has dropped to 24.3 per cent, and at 15 years it has risen to 59.5 per cent. Correspondingly, the condition per cent decreases from 100 per cent to 33.1 per cent at 7 years; increases to 75.7 per cent at 10 years, and decreases to 40.5 per cent at 15 years. Yet during the whole period the cross ties have been maintained at absolutely 100 per cent.

The thought has always seemed reasonable that so long as a cross tie is able to support the rail and to hold it to gage under traffic, the cross tie is 100 per cent efficient. When a cross tie cannot perform these functions it has no value as a cross tie and should be replaced, which is the same thing as saying that cross tie maintenance condition is indicated by the number of cross ties which should be replaced immediately and is measured by the ratio of the cross ties remaining to the whole number of cross ties in the section of track considered. The curves in Fig. 2 support this view.

Articles have been written that claim to prove that, in general, the depreciation on cross ties in any track is uniformly 50 per cent and there have been many statements to that effect. The curves in Fig. 2 show conclusively that as the condition of uniform cross tie renewals is approached the curves representing depreciation and condition per cent separate and that a time will come when the depreciation curve will lie entirely below, and the condition per cent curve above the 50 per cent line.

The computed straight line depreciation and condition per cent for uniform renewals indicates that when this stage is reached the uniform depreciation for cross ties of nine years average life will be 44.34 per cent and for seven-year cross ties 42.81 per cent, while the uniform condition per cent will be correspondingly 55.66 per cent and 57.19 per cent. Depreciation computed on the sinking fund basis would be less and condition greater.

Repeating: The data for the preparation of the accompanying curves are insufficient to warrant the claim that the curves are conclusive. The curves are typical and it is believed that they reasonably approximate the facts.

The effect which such curves may have on practical maintenance is doubtful and would depend upon the intelligence with which they are employed. Cross tie renewals on well managed railroads are determined by actual inspection and carried out under careful supervision and properly should be. There are situations where the indications of the curves should serve as an excellent check on the inspections in which any material difference between the two should justify investigation or reinspection. Certainly, some of the thoughts suggested by these curves have a direct bearing on important issues and should stimulate and justify the continuance of tests now under way and the making of others until sufficient, definite information may be had for the development of similar curves from indisputable data.

A Study of the Influence of Treated Timber*

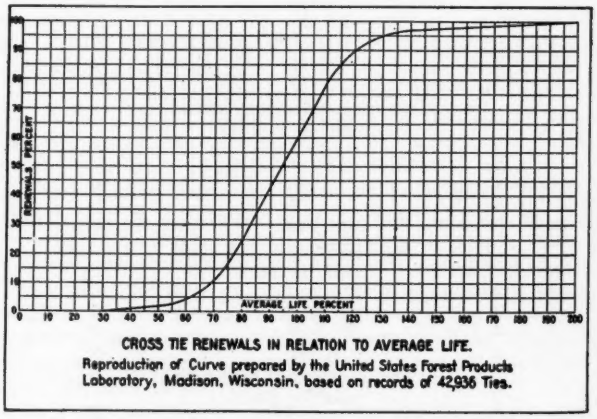
BY LOWRY SMITH,

Assistant District Engineer, Northern Pacific, St. Paul, Minn.

MANY WIDELY diverging opinions are held as to the exact effect that the use of treated timber will have upon the annual cross tie requirements. Some believe that this will very soon reduce the annual requirements to a low rate which will remain uniform throughout their use; others go so far as to believe that after the untreated ties have all been replaced with treated ones there will be no renewals required for a long period, and hesitate to install treating plants, being under the impression that there will be nothing for the plants to do after complete replacement of the untreated ties has been accomplished. Such ideas generally result from lack of serious consideration of the subject and are held, as a rule, by those who have had no experience with the use of treated ties. Those who have used treated ties for any length of time realize that such ideas are false, but they generally have no very definite idea as to what should happen.

In forming any such conclusion as outlined above, the fact is overlooked that the preservative treatment simply increases the resistance of the tie to decay and that it does not overcome any other physical or mechanical weaknesses that the wood may have to start with. The variability of wood, even of the same species, is so great that it is impossible to impart to all of the ties the same degree of resistance to decay, and the law of averages applies to the treated wood in the same manner as the untreated except that the average rate of renewal is greatly decreased. Treated ties will, of course, fail, as will untreated, the difference being that the average rate of failure of the treated is much less and that the time required for total failure in the case of any number of treated ties will be much longer than for the same number untreated.

In order to clear up this subject as much as possible the writer has prepared the chart in Fig. 4 which shows graphically the theoretical effect of the use of treated cross ties upon the annual rate of renewal. The basis of this chart is the curve shown in Fig. 3 which was presented before the American Wood-Preservers' Association in 1918 by Mabel E. Thorne, then connected with the United States Forest Products Laboratory, Madison, Wis. This curve shows the rate of failure of cross ties expressed in per cent for various per cents of their average life. It is compiled from the records of over forty thousand experimental ties in the United States and is the best information on the subject available. The value of it lies in that by knowing or assuming the average life for ties of a certain kind it is possible to approximate with reasonable accuracy the per cent of



CROSS TIE RENEWALS IN RELATION TO AVERAGE LIFE.
Reproduction of Curve prepared by the United States Forest Products Laboratory, Madison, Wisconsin, based on records of 42,936 Ties.

Fig. 3—Failures of Cross-Ties in Per Cents of Various Per Cents of Average Life.

*Abstracted from a paper presented before the American Wood Preservers' Association at Chicago on February 11, 1920.

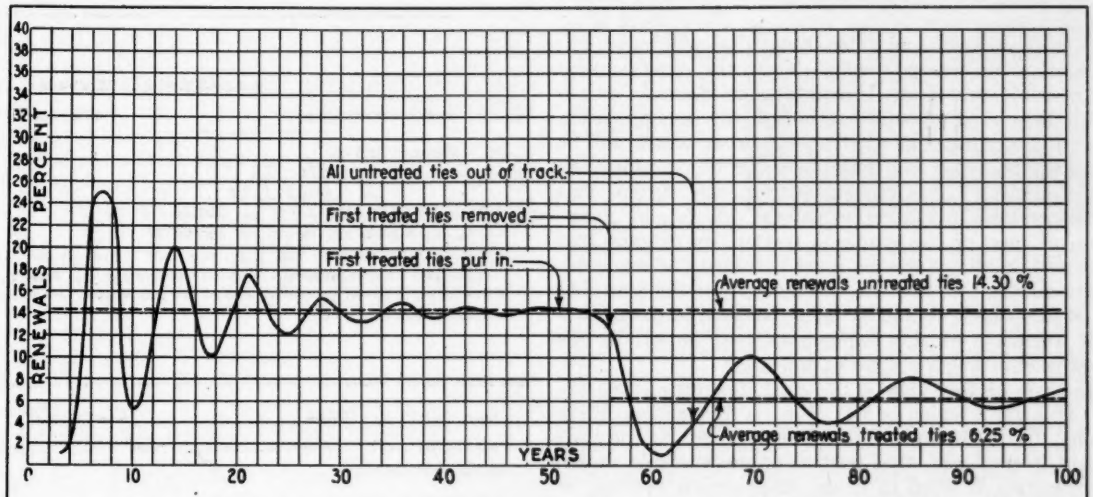
the total that will fail each year over the life of the entire lot. When presenting the curve, Miss Thorne called attention to the fact that on account of the great range of variability of the properties of wood it could not be expected to be applicable to a small number of ties nor below a total failure of about 25 to 30 per cent, but that on lots of several thousand ties, enough to establish a fair average, it would give very good results.

For the purpose of making the chart in Fig. 4, it was assumed that a piece of track was constructed new with ties having an average life of seven years, which is about the average life of untreated ties throughout the United States, and that all renewals were made with such ties for a period necessary to establish a uniform rate of renewal and that from then on all renewals were made with treated ties, having an average life of 16 years.

Having assumed the average life for the untreated and treated ties reference to Fig. 3 shows the approximate per cent that it will be necessary to renew each year. Assuming that a start is made with 100 per cent untreated ties, all placed in the track at the same time, the per cent that it is necesary to renew each year is tabulated horizontally. The per cent necessary to renew each subsequent year is found by taking the total of the renewal percents appearing in the column for that year. It will be made up of a certain per cent of the ties put in each year previous to that one up to the maximum life of the ties. By following out this method and using the total per cent renewed each year as ordinates and the years as abscissas, the renewal chart was plotted.

Fig. 4 brings out some very interesting points. First is the fact that the renewals occur in cycles greater and less than the percentage representing the average rate and that as the age of the track increases the variations above and below the average grows less until eventually, in this case about 50 years, practically a uniform rate of renewal becomes established. This is the point where, for the purpose of illustration, the use of treated ties was begun and it will be noted that from there on the rate of renewals drops off very rapidly until after about nine years a very low rate has been reached, which increases for a time, after which it decreases and so on swinging above and below the line of average approaching closer to the uniform rate as time goes on. Particular attention is called to this low point and the subsequent increased rate of renewal for the reason that, as already stated, many persons not having a true conception of what really should occur are apt to become possessed of an exaggerated idea of the benefits to be derived from the use of treated ties while the rate of renewal is dropping and an unjustified uneasiness when the low point is reached and the rate of renewal begins to increase.

It must be understood that Fig. 4 is based on purely hypothetical conditions, that all renewals are made upon the basis of actual failure and not upon any fluctuating policy brought about by change of management or state of finances, and cannot be taken as representing the actual condition as existing in any piece of track. However, it can be taken as an indication in a general way of what to expect from the use of treated ties, as has been proven by checking it against the experience of some of those who have used them for some time.


RENEWALS PERCENT
YEARS
All untreated ties out of track.
First treated ties removed.
First treated ties put in.
Average renewals untreated ties 14.30 %
Average renewals treated ties 6.25 %

THEORETICAL EFFECT OF THE USE OF TREATED CROSS-TIES UPON ANNUAL CROSS-TIE REQUIREMENTS.

Based on results from records of over forty thousand test ties in the United States, as shown in curve prepared by the Forest Products Laboratory, showing the relation between renewals and average life. Assumed in this case the use of untreated ties with average life of 7 years until stable renewal rate has been established and then making all renewals with treated ties having average life of 16 years.

Fig. 2. Theoretical Renewals of Cross-Ties as Affected by the Change of Treated Timber

It may be of interest to know that by the use of the Forest Products Laboratory curve in connection with tie renewals as actually made, a chart similar to the one submitted herewith can be prepared and carried forward, that will indicate with reasonable accuracy what to expect in the way of cross tie renewals several years in advance of the actual requirements.

A WARNING.—The Railroad Commission of Wisconsin has ordered 50,000 handbills printed dealing with the danger at railroad grade crossings. These handbills are to be distributed throughout the state and will be posted by both municipal and steam railroads. In addition 10,000 of the handbills have been printed on cardboard, will be hung in public garages, hotels and banks and attached to every highway map sent out by the State Highway Commission. The handbill is headed "YOU MAY BE THE NEXT."

STUDYING THE LABOR TURN-OVER

By William S. Wollner

THE CONSTANTLY diminishing supply of men in the reservoir from which maintenance of way labor is drawn, which has become more and more pronounced during the last 8 or 10 years, and the frequent turn-over of labor of this class, indicates the necessity for a study by individual railroads of its causes. In general, the causes may be divided into two groups: (1), restlessness of labor of the type secured, which is well recognized and might be termed one of the "customs of the trade," and (2), causes local to the particular property, such as lack of proper housing facilities, inadequacy of rates of pay, etc.

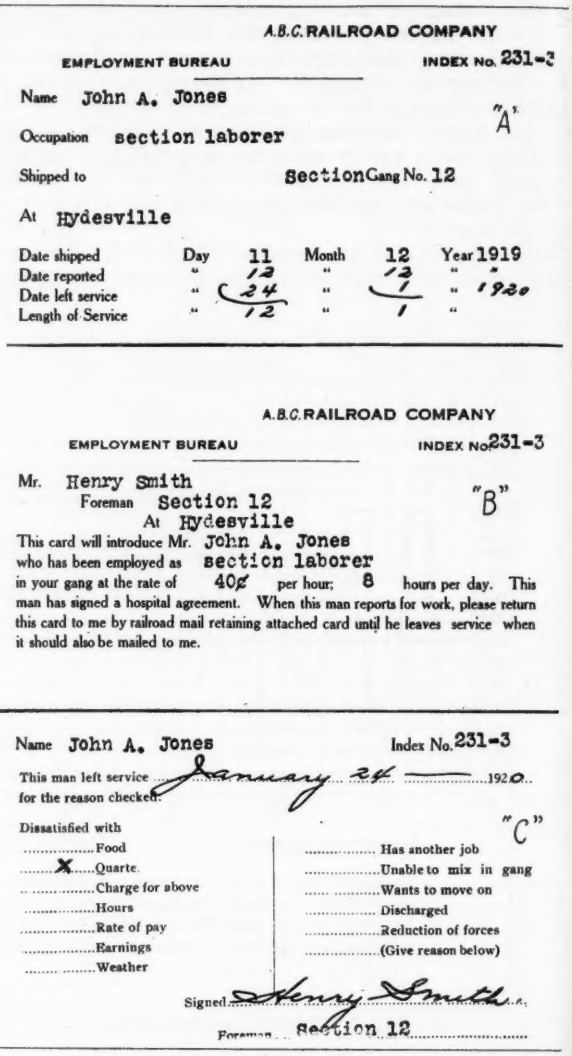
As to the first the situation in general is too well understood to require a special investigation to determine the reasons therefor, but as to the second the local causes for labor turn-over can only be determined adequately through a systematic survey. It is certain that the causes must be recognized before they may be removed, and it is a wise management indeed that faces the present labor shortage by providing all those things that will make employment on its property attractive to the class of men from which it must draw its maintenance forces.

With this in mind, a western railroad inaugurated a plan of maintenance labor turn-over survey which will be of interest to those who wish to solve this problem on their properties. It is recognized that any system that must depend for its success upon the efforts and co-operation of men of the grade of section, extra gang and bridge and building foremen must necesarily be made extremely simple, and this was the keynote of the plan that is to be described; simplicity being considered paramount to the securing of the refinements that appeal to the analyst in outlining a system of this kind.

The basis of this plan is the card illustrating this article. This card, which is 5 by 9 in., is divided into three sections, "A," "B" and "C" each 3 by 5 in. At the time the man is employed, that portion of the example shown in typewriting is filled in in the employment bureau. It will be noted that all three portions of the form which it is possible to fill in, are taken care of at this time in order to lessen the amount of work required of the foreman. The system of applying index numbers is extremely simple, all orders for men as received in the employment bureau being numbered consecutively, which number is used as the first portion of the index number. As men are employed to fill this order, they are also numbered consecutively, which furnishes the second part of the index number. In the example shown herewith the man was the third employed on Order No. 231, which we will assume was an order for five laborers for Section Gang No. 12. This index number is used to identify a man through his entire period of employment.

After the card has been made out, the portion "A" is detached and filed in the first drawer of a four-drawer card cabinet. Portions "B" and "C" are given to the man in an envelope addressed to the foreman to whom he is to report. When this man reports for work, the foreman merely detaches the card "B" and drops it in the railroad mail, the reverse bearing printed address for this purpose, which is also true of card "C." Upon receipt of card "B" in the employment bureau, it is attached to its corresponding card "A" and placed in the second drawer of the card file. In all cases where the card "B" is not returned in due time, it is traced by the employment bureau to determine whether failure to receive it is due to the man not having reported for duty, or to the carelessness of the foreman. If it is learned that the man did not report for duty, card "A" is placed in the fourth drawer.

Assuming that the man has reported for work, and card "B" has been properly returned to the employment bureau, the foreman retains card "C" until the man whose name it bears, leaves the service, at which time he forwards it with the date that the man left the service written in the space provided, and a check mark against the reason for his leaving. Upon receipt in the employment bureau it



A.B.C. RAILROAD COMPANY

EMPLOYMENT BUREAU INDEX No. 231-3

Name John A. Jones "A"

Occupation section laborer

Shipped to Section Gang No. 12

At Hydesville

Date shipped	Day	11	Month	12	Year	1919
Date reported	"	13	"	13	"	"
Date left service	"	24	"	1	"	1920
Length of Service	"	12	"	1	"	

A.B.C. RAILROAD COMPANY

EMPLOYMENT BUREAU INDEX No. 231-3

Mr. Henry Smith "B"
Foreman Section 12
At Hydesville

This card will introduce Mr. John A. Jones who has been employed as section laborer in your gang at the rate of 40¢ per hour; 8 hours per day. This man has signed a hospital agreement. When this man reports for work, please return this card to me by railroad mail retaining attached card until he leaves service when it should also be mailed to me.

Name John A. Jones Index No. 231-3

This man left service for the reason checked: January 24 1920

"C"

Dissatisfied with

	Food		Has another job
X	Quarte		Unable to mix in gang
	Charge for above		Wants to move on
	Hours		Discharged
	Rate of pay		Reduction of forces
	Earnings		(Give reason below)
	Weather		

Signed Henry Smith

Foreman Section 12

Specimen Card Used to Check the Labor Turn-over

is attached to its corresponding cards "A" and "B" and filed in drawer three for use in compiling turn-over statistics.

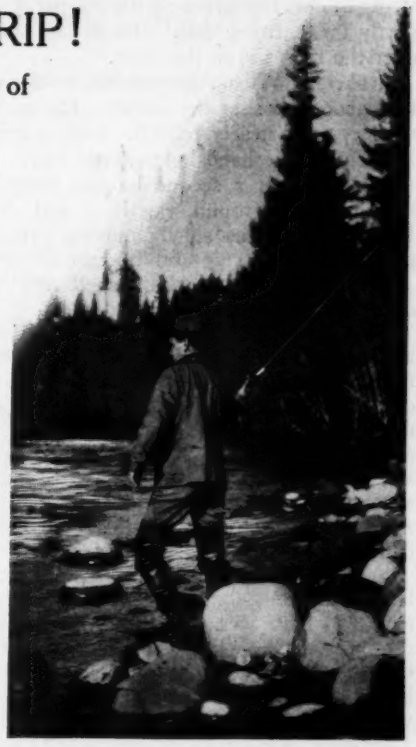
The compilation of data obtained from these cards furnishes an index to reasons for labor turn-over at definite points as well as for the entire property. It permits of local conditions being adjusted, as for instance, inadequacy of food or quarters; and furnishes as well, the relation of rates of pay, etc., to labor turn-over on the entire property.

PROTECTION OF FORESTS FROM FIRES.—This was the subject of a conference at Harrisburg on May 4 between the governor of Pennsylvania, the Chief of the Department af Forestry, Gifford Pinchot, and about 40 railroad representatives. In a number of especially dangerous locations the railroads agreed to burn a strip 100 ft. wide along their rights of way. A number of serious fires have occurred this spring in Pennsylvania.

BUT ON THE THOUSANDTH TRIP!

John Rouse Wouldn't Spoil his Fishing Trip for the Sake of a Weekly Formality That he Considered Entirely Superfluous—But, "You Never Can Tell"

BY CHARLES H. SMITH



IT WAS the first day of May, which, it will be remembered, came on Saturday, and the hour was 3:45 p. m., when a motor car rolled into the little town of Englishville on the Northern division of the C. G. R. & W. R. R. As it slid up in front of a car house and stopped, Foreman John Rouse and his men jumped off the car and while some of them threw their weights on one end of the car to act as a counterbalance the rest of them lifted the other end from the rails and swung it around to head it towards the door of the car house. Lifting the wheels of the car over the rail they pushed it along the wooden rails to its place inside the car house, locked the door and, with their dinner-pails in hand, were about to leave.

"You needn't show up to-morrow morning, boys," said Rouse. "I guess the old pike will take care of itself for one Sunday without our help."

A few minutes later from the opposite direction from which Rouse and his men had come they heard the exhaust of another motor car which soon appeared around the curve. Slowing up, it stopped before a second car house a few rods to the west of Rouse's and the men it carried jumped off and put the car away. Rouse, who had evidently been waiting for the arrival of this car, walked over to it.

"Well, how goes it?" he asked.

"Good," answered Frank Sampson, who was foreman of the second gang. "We've got the track in pretty good shape and are going to start putting in ties Monday morning."

"That so? You've got us beaten, then. I don't expect to start putting in my ties for a week yet, anyway."

For a minute Rouse pulled on his short-stemmed pipe.

"What do you say about going after some trout tomorrow morning?" he asked, coming to the point of his errand suddenly. "The season opened this morning and I believe we can get some good ones over at Rapid creek."

Both Sampson and Rouse were ardent trout fishermen. Neither had lost his youthful love of the sport and the fact that the season opened on Saturday gave them a chance to fish on the second day—a time when the fishing is very nearly at its best. The two foremen had been fishing together many times while they had held the adjoining sections with their headquarters in the same town.

"I'm going to start bright and early—at about four a. m.," continued Rouse. "And you'd better plan on going along with us. Franklin and Anderson are going, too."

"What time are you going to run your section?" asked Sampson.

"I'm not going to run it," replied Rouse, laughing. "All nonsense running it on Sunday, anyway. We can let the sections go this time in order to get the trout. I've told my men not to show up in the morning."

For a short space Sampson remained thoughtfully silent. He wanted to go fishing as much as Rouse did, but there were other considerations.

"I don't know," he replied at last. "Something might happen and if a man didn't run his section he'd feel to blame if it was something that he could have prevented."

"Forget it," scoffed Rouse. "What could happen? You just said that your track is in good shape — and you've just run over it. If you are ready to start putting in your ties it must be a lot better than mine—and I'm going to leave mine."

"You never can tell," answered Sampson. "I don't suppose that anything will happen—but I don't know."

"Why, man alive, you've been working on Section B-8 for nearly fifteen years, haven't you? And you've run your section every Sunday during that time except when you were laying off. Fifty-two times a year for fifteen years. Why, you've been over your section on Sunday nine hundred and ninety-nine times and I'll bet you have never found anything on all those trips that couldn't have gone safely until Monday," challenged Rouse.

"No," admitted his brother foreman. "I don't remember that I ever found anything seriously wrong. Still—on the thousandth trip something might happen."

Rouse laughed good-naturedly. "All right," he said. "I see I can't convince you. But just wait until you see the nice bunch of speckled beauties I'm going to get—then you'll be sorry that you didn't go along."

"Good luck, John," returned Sampson as they separated.

"I'll bring you over some trout if I have it," answered Rouse over his shoulder as he started towards home. Then to himself as he drew away: "Frank is a good foreman, but he is afraid of his job."

And here let it be recorded that nothing went wrong on Rouse's section the following Sunday. He guessed correctly. Nothing happened which required his attention, but—

At 6:15 Sunday a. m. Extra 1029 West passed through Englishville. It was a long, heavy drag and went slowly around the curve up the grade. Over the crest it gathered speed and shot downward for three miles in an effort to climb a second grade into Hillcrest, where the engineer figured on heading in and letting No. 1, the fast passenger train, go by. The train rolled rapidly along around the curves until it struck the grade leading into Hillcrest and then began the struggle to gain the top of the hill. Slower and slower the train moved and when it was within a few rods of the switch the head brakeman jumped off the pilot of the engine, ran ahead and opened it. For a few minutes it seemed as if the heavy

string of cars must stall on the hill partly in the siding and partly on the main line. But at last the caboose passed over the frog and in the clear.

Brakeman Wilson stepped out on the rear platform of the caboose to shut the switch. He started to run down the steps and nearly fell off. Only a quick tightening of his grip on the hand holds saved him. The bottom step was gone. For a second he was nonplussed. Then he leaped to the ground, ran back and closed the switch. Running after the slowly moving caboose he caught it on the opposite side and ran up the steps.

"Hey, Bill! We've hit something!" he called to the conductor.

The train came to a jerky stop and the brakeman and the conductor got down on the ground and began inspecting their train. On the right hand side the bottom steps on the front and rear ends of the caboose had been torn off. The lack of any other phenomena other than some slight gashes on the sides of the caboose and the cars ahead of it explained why they had failed to note the obstruction when they had passed it. The two trainmen started towards the head end seeking the place where the damage started.

Seven cars ahead of the caboose were two flats which had been loaded with a huge crane which extended the length of both cars. When the brakeman and conductor came to the flats they were empty. The bracing timbers had given away, allowing the heavy steel structure to break loose and topple over the sides of the flats. It was very plain that it had fouled the clearance of the train after it dropped so as to cut off the caboose steps as the train dragged past it. The conductor looked at the empty cars in astonishment.

"We've lost that big crane," he said, and started on a run for the telephone booth.

He pulled his switch key from his pocket as he ran and unlocking the door to the booth he flung his hat from his head and slipped the receiver over his ear.

"Hello, dispatcher," he shouted into the vulcanized mouthpiece. Then as the dispatcher answered him: "Say, this is Lloyd on the 1029. We just got into clear here at Hillcrest and in looking over the train found that we have lost a big crane loaded on two flats. It raked our train badly and it must be foul of the main line somewhere between here and Elmwood. Can you stop No. 1 and tell them about it? They'll probably hit it if they aren't notified."

A rhythmic tattoo beat in the receiver on Lloyd's ear, telling him that the dispatcher was ringing Elmwood to catch No. 1.

"Have you any idea where you lost it?" asked the dispatcher.

"It must have been on some curve when we were going down grade that it broke loose. I think it was at least 2 miles east of here, if not farther.

"Elmwood," came the operator's voice over the wire.

"Can you get No. 1?"

"They've just gone. Arrived at 7:44, departed at 7:45."

"Can you get anyone on a private phone at Englishville and have them flag No. 1? Extra 1029 has lost a big crane off their train which may be fouling the main line. I can't head No. 1 off—no agent on duty at Englishville on Sunday, you know."

"I'll try it. But there is no central on this farmers' line until eight o'clock on Sundays," replied the operator.

Five minutes passed slowly by and then the operator at Elmwood again cut in. "Couldn't raise a soul," he said. "I rang them for two minutes steady, too."

"That's all we can do, then, I guess," replied the dispatcher. . . . "Are you there, Lloyd?"

"Yes."

"No. 1 left Elmwood 7 minutes late. If you see them coming let me know the minute they are in sight."

In his office 152 miles away the dispatcher waited for word from the train. In the little telephone booth Conductor Lloyd stood at the door with the telephone receiver over his head while his brakeman searched the distance from his vantage point on top of a box car for some trace of No. 1 coming. The minutes dragged by until 8:01 came when the passenger train should have been in sight at Hillcrest.

"Hello, Lloyd," called the dispatcher.

"Lloyd. Nothing in sight yet."

Another 10 minutes elapsed.

"Anything doing yet, Lloyd?" again asked the dispatcher.

"Nothing at all."

"I guess something has happened to them, then," said the dispatcher.

Then another voice came in on the phone. "Hello, dispatcher," someone called very faintly.

"Yes—this is the dispatcher. What is it?"

"This is the section foreman talking—Sampson. We found a big crane close beside the track this morning when we were patrolling the track. I think it has fallen from some freight train. We flagged No. 1 and the conductor got about 50 men—passengers on his train—and we rolled it down the bank to clear the track. No. 1 was delayed about 15 or 20 min. here."

"Good for you!" exclaimed the dispatcher. "Is the track and everything O. K. where the crane fell?"

"Yes—everything is O. K. now," replied Sampson over his telephone that he had hooked on the wires.

"No. 1 is coming here now," broke in Lloyd.

* * * * * *

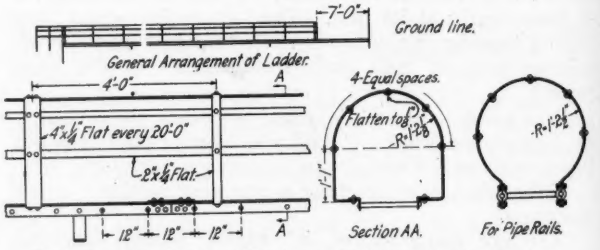
Rouse returned from his fishing trip about two o'clock that afternoon, bringing Sampson a very nice mess of brook trout. The fish had been biting good.

"You cheated yourself out of a good time, Frank," he told Sampson gleefully.

"Maybe," replied his brother foreman. "But," he continued enigmatically, "I ran over my section and I found that it was the thousandth trip for me."

A SAFETY LADDER

CLIMBING A VERTICAL ladder on a building, bridge, tower or chimney, is always a disagreeable and dangerous job. Not only can this task be made much safer, but the natural feeling of nervousness may be very largely relieved by equipping the ladder with a basket or hoop guard like that shown in the drawing. This consists essentially of hoops of strap iron arranged to enclose the climber and connected by four or five longitudinal strips. Experience has shown that the hoops should have an approximate diameter of 27 in. This drawing was taken from the National Safety News for March 1, 1920, where it is published as a supplement to "Safety Practices, Pamphlet No. 1 on Ladders."



Details of a Ladder Equipped With a Safety Basket

A Track Scale With Many New Features

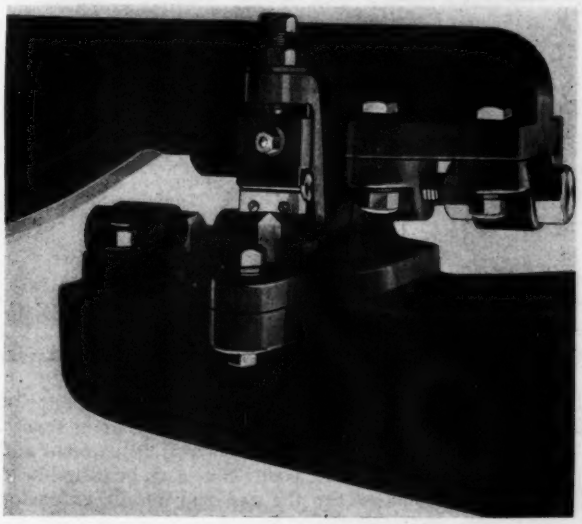
Design Recently Introduced Meets Requirements of Specifications Adopted Jointly by Interested Associations

By L. R. Boyer,
Sales Engineer Fairbanks, Morse & Co., Chicago

A TRACK SCALE embodying a number of new and exclusive features has been developed by E. & T. Fairbanks & Co., St. Johnsbury, Vt. This development was occasioned partly by the new specifications adopted jointly by the American Railway Association, the American Railway Engineering Association, the Railroad and Warehouse Commission of Minnesota, the National Scale Men's Association, the Bureau of Standards, and the Scale Manufacturers' Association. These specifications make necessary such changes in the design of scales on the market up to this time, that the new scales in accord with them are not interchangeable with the old scales. While changes were being made that were sufficient to destroy the interchangeability of the new and old scales, it was decided to go further and remove incongruities in design that were and have been present in scales ever since the first was built nearly ninety years ago. The feature first noticed in this scale is the departure from the use of the customary I-section levers, and going to the consistent use of the double web section throughout all levers of the scale.

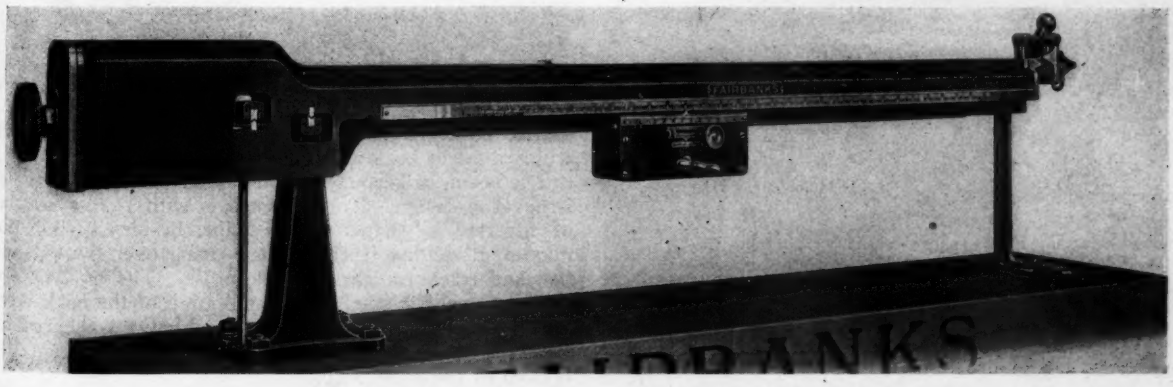
The scale is built in four sections, with a series of primary or main levers transmitting the load to longitudinal extension levers, which in turn transmit the load to a transverse extension lever which connects through a shelf lever to the beam. It is built in two capacities for light duty service, or such service where only a relatively small number of cars are to be weighed. These two capacities are 60 tons and 75 tons per section and in lengths of 50 ft., 56 ft. and 60 ft. effective weighing rail. For heavy service or where a large number of cars are to be weighed the scale will be built in capacities of 75 tons and 100 tons per section, and in the same three lengths as above. The difference between the light duty and heavy duty scales is mainly in the loading per linear inch of knife edges, this being 5,000 lb. in the heavy duty scales and 6,000 lb. in the light duty scales. This difference in allowable loading and the allowance of a higher multiple main lever in the light duty scales serves to make somewhat lighter castings than are necessary in the heavy duty scales.

The main suspension consists of a T-head bolt of special bolt steel, carried at its head on a double web steel saddle resting on self-aligning steel blocks which bear equally upon two elements of the main lever load knife edges. The lower end of the suspension bolt is threaded and carries a circular steel nut. The upper face of this nut has circular milled recesses along three equally-spaced diameters. A steel trunnion block resting on the nut has



Knife Edge Connection Between End and Middle Extension Levers

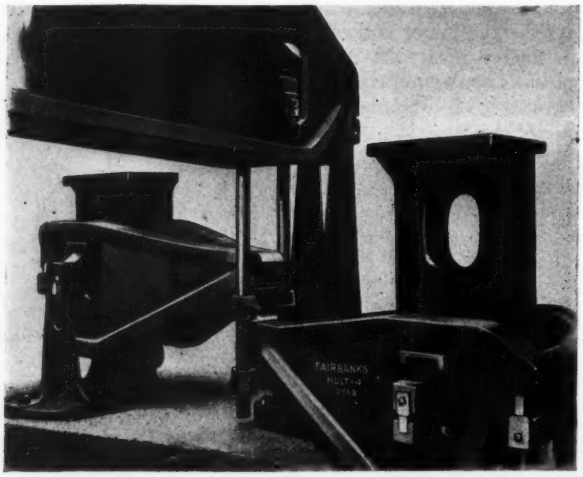
milled cylindrical bosses on the lower side for the purpose of seating in any desired recess on the nut. When the trunnion, which has a fixed position, rests in the recesses of the nut, the combination is self-locking so that the nut cannot back off during the disturbance of the scale in regular weighing service. The trunnion block has circular turned hubs positioned to run coincident with the center line of the main lever. The main girder chair has circular chilled seats to rest upon the trunnion block hubs. The combination of these elements allows univer-



Fly Beam Introduces Novel Features

sal motion of the scale platform in a horizontal plane without displacing the knife edges on their bearings. The combination of the six-pitch thread on the suspension bolt and 1/6-turn of the nut provided by the milled recesses on the face of the nut provides a vertical adjustment by 1/36-in. steps.

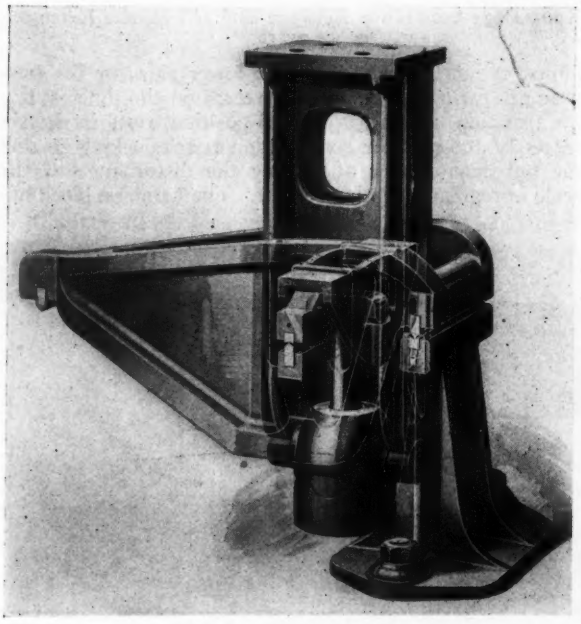
All connections between levers are made on the center lines of the levers. The main levers are connected to the extension levers by two bolts of special bolt steel. These



Showing the Manner of Making Connections Between Levers

bolts connect steel-lined bearing blocks which engage the knife edges of the extension lever and the main levers. The bolts are threaded to provide vertical adjustment and have lock nuts to secure the position of each bearing block.

The connection between the end and middle extension



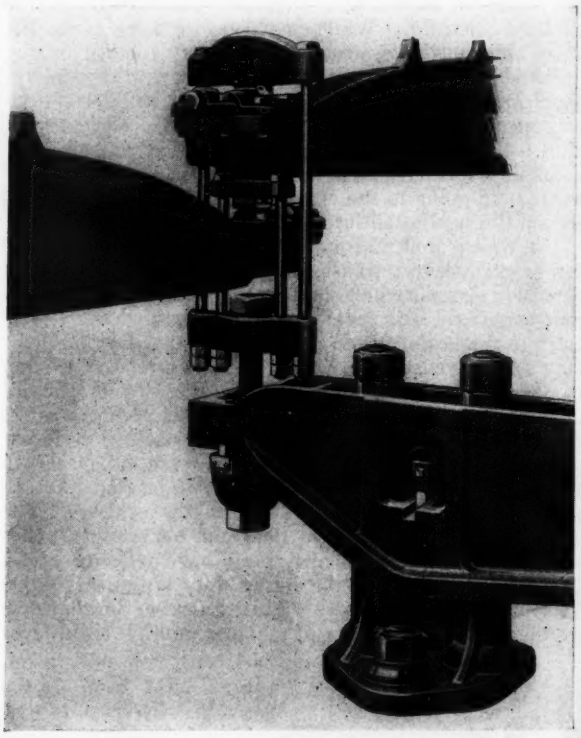
Details of the Main Suspension

levers is suspended on the knife edge of the middle lever. It contains three compensating steel bearing blocks, one resting on the knife edge of the middle lever, and the other two engaging the two elements of the knife edge of the end extension lever.

The longitudinal connecting levers transfer their load through a single bolt directly to the center of the transverse lever bearing. Independent vertical adjustment is provided for each of the longitudinal levers. This center line connection allows for the transverse or fifth lever to extend at any desired angle with the center line of the scale, providing a wide latitude in placing the beam without the use of extension levers.

Nose irons have machined tongue and groove engagement with the levers, insuring movement of the knife edges truly along the center line of the lever, and maintaining their parallel alinement. Such movement is controlled by non-corroding adjusting screws.

All pivots throughout the scale are machined all over and fitted into machined seats. The edge of the pivot is hardened to resist scratching with a file, while the back of the pivot is drawn relatively soft. The design of the levers is such that all pivots and their bearings are in contact throughout their full length. This means that



A Single Bolt Connects Longitudinal and Transverse Levers

there are no overhanging pivots driven through the lever which must be backed up by heavy bosses of metal.

The beam, in keeping with the other parts of the scale, is novel in design. It is of cast iron with a cross section of inverted U shape. This shape, besides giving the maximum rigidity, furnishes a housing over the balance ball and track for carrying the poise. The notches are cut in a steel bar inserted in the bottom of the back web, which insures that no dirt can fall and lodge in them. The type for printing weights on tickets is fastened on the bottom of the front web.

The center indicating poise suspended from three ball-bearing trolley wheels runs smoothly upon a machined track housed inside the beam. Its exact weighing position is determined by a positive locking device of 30 or more teeth engaging the same number of notches of the beam. This locking device or pawl moves in vertical guides that are tight, to hold the poise in position.

For both light and heavy service scales all parts are designed so that when loaded to rated capacity the stresses developed will not exceed those in the following table:

WORKING STRESSES IN POUNDS PER SQUARE INCH

Nature of stress	Cast-iron	Steel castings	Machinery steel	Structural steel	Steel for knife edge and bearings: High carbon	Steel for knife edge and bearings: Special alloy	Special bolt steel
Tension	1,500	8,000	8,000	10,000	24,000	30,000	15,000
Compression	8,000	10,000	8,000	10,000	24,000	30,000	.....
Transverse Bending—							
Tension	2,500	8,000	8,000	10,000	24,000	30,000	.....
Compression	8,000	10,000	8,000	10,000	24,000	30,000	.....
Shear	2,500	6,000	5,000	7,000	.....	.....	.....
Torsion	2,500	6,000	.....	7,000	.....	.....	.....

The loading for knife edges will not exceed 5,000 lb. per linear inch on heavy duty scales and 6,000 lb. on light duty scales. The tensile strength of special bolt steel used is not less than 120,000 lb. per sq. in.

1919 RAIL PRODUCTION SHOWS MARKED DECREASE

THE RAIL production in the United States in 1919 was even lower than in 1918, so that the totals of 2,203,843 tons and 2,540,892 tons for these two years, respectively, give a combined production during the first 24 months of the period of federal control of 4,744,735 tons, which is only 766,848 tons more than the production in the one year of 1906. These are some of the interesting facts brought out by Bulletin No. 2 for 1920 issued by the American Iron & Steel Institute. The table below shows a comparison of rail production for the years 1904 to 1919 inclusive.

PRODUCTION OF RAILS BY PROCESSES, IN GROSS TONS

Years	Open-hearth	Bessemer	Rerolled*	Electric	Iron	Total
1904	145,883	2,137,957	.....	.....	871	2,284,711
1905	183,264	3,192,347	.....	.....	318	3,375,929
1906	186,413	3,791,459	.....	.....	15	3,977,887
1907	252,704	3,380,025	.....	.....	925	3,633,654
1908	571,791	1,349,153	.....	.....	71	1,921,015
1909	1,256,674	1,767,171	.....	†	.....	3,023,845
1910	1,751,359	1,884,442	.....	†	230	3,636,031
1911	1,676,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,099,926	119,390	3,455	.....	3,327,915
1913	2,527,710	817,591	155,043	2,436	.....	3,502,780
1914	1,525,851	323,897	95,169	178	.....	1,945,095
1915	1,775,168	326,952	102,083	.....	.....	2,204,203
1916	2,269,600	440,092	144,826	.....	.....	2,854,518
1917	2,292,197	533,325	118,639	.....	.....	2,944,161
1918	1,945,443	494,193	101,256	.....	.....	2,540,892
1919	1,893,250	214,121	96,422	50	.....	2,203,843

*Rerolled from old steel rails. Included with Bessemer and open-hearth steel rails from 1904 to 1910, inclusive.
†Small tonnages rolled in 1909 and 1910 but included with Bessemer and open-hearth rails for these years.

The next table shows a comparison of the production of rails by processes during 1918 and 1919, wherein it is seen that the production of Bessemer rails in 1919 was only 214,121 tons, or 9.71 per cent of the total, as compared with 19.45 per cent for 1918. In the table above the marked reduction in the manufacture of Bessemer rail since the maximum production of 1906 would seem to indicate that the manufacture of Bessemer rail will soon be a thing of the past.

PRODUCTION OF RAILS, SHOWING INCREASE BY PROCESSES, 1918-1919

Kinds	1918	Per cent	1919	Per cent	Increase	Per cent
Open-hearth	1,945,443	76.57	1,893,250	85.91	*52,193	2.68
Bessemer	494,193	19.45	214,121	9.71	*280,072	56.67
All other	101,256	3.98	96,472	4.38	*4,784	4.72
Total	2,540,892	100.00	2,203,843	100.00	*337,049	13.26

*Decrease.

The total production of rails as given in the first table includes, in addition to new rails rolled, rails rerolled from defective rails and from old rails.

The last table shows the production of rails by weight per yard which records a further falling off of the production of rail weighing 100 lb. per yard or over. The 1919 rolling was 478,892 tons, whereas the maximum figure obtained in 1916 was 766,851 tons. There was some recovery in the case of rail weighing 85 lb. and less than 100 lb., but the total of 965,571 tons for 1919 is still considerably under the 1,225,341 tons of 1916.

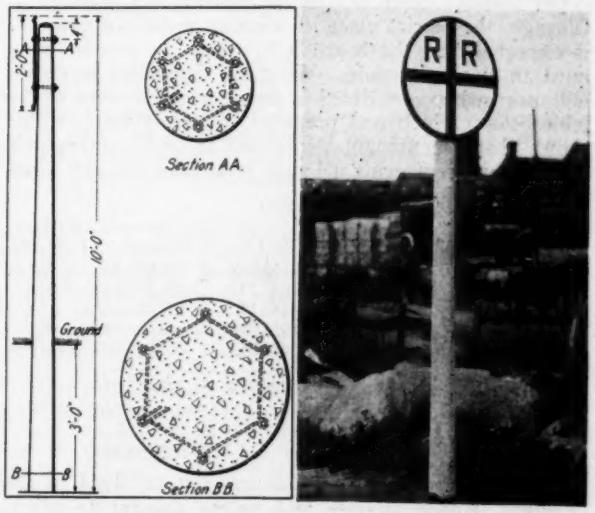
PRODUCTION OF RAILS BY WEIGHT PER YARD, 1902-1919

Years	Under 45 pounds	45 and less than 85	85 and less than 100	100 pounds and over	Total Gross tons
1902	261,887	2,040,884	645,162		2,947,933
1903	221,262	1,603,088	1,168,127		2,992,477
1904	291,883	1,320,677	672,151		2,284,711
1905	228,252	1,601,624	1,546,053		3,375,929
1906	284,612	1,749,650	1,943,625		3,977,887
1907	295,838	1,569,985	1,767,831		3,633,654
1908	183,869	687,632	1,049,514		1,921,015
1909	255,726	1,024,856	1,743,263		3,023,845
1910	260,709	1,275,339	2,099,983		3,636,031
1911	218,758	1,067,696	1,536,336		2,822,790
1912	248,672	1,118,592	1,960,651		3,327,915
1913	*270,405	†967,313	2,265,062		3,502,780
1914	*238,423	†309,865	868,104	528,703	1,945,095
1915	*254,101	†518,291	742,816	688,995	2,204,203
1916	*295,535	†566,791	1,225,341	766,851	2,854,518
1917	*308,258	†882,673	989,704	763,526	2,944,161
1918	*395,124	†665,165	888,141	592,462	2,540,892
1919	*263,803	†495,577	965,571	478,892	2,203,843

*Includes rails under 50 pounds.
†Includes 50 pounds and less than 85 pounds.

CONCRETE POSTS FOR HIGHWAY CROSSING SIGNS

CONCRETE POSTS have been put to a new use in connection with the introduction of standard highway crossing signs in many states in this country. Distance or approach signals mounted on concrete posts were installed in large numbers in Wisconsin during the past year, and also to some extent in Illinois. These posts were purchased by the county highway officers under the authority of the State Commission and are erected on the highway within 300 ft. of the railway crossings.



A Drawing and a Photograph of the Sign

These posts, which were supplied by the Madison Concrete Products Company, Madison, Wis., are made of reinforced concrete, and are circular in section with a top diameter of 3½ in. and a bottom diameter of 5¼ in., the total length being 10 ft. The reinforcement consists of six strands of No. 8 Bessemer steel wire placed as shown in the drawing and held by cross bonds at intervals of 2½ ft. The signs, which are of enameled steel, 24 in. in diameter, marked according to the standard regulations, are attached to the posts by two bolts which pass through holes cast in the posts for the purpose. These posts are manufactured by automatic power-driven machines of the type used in the manufacture of concrete fence posts in which the materials are measured and mixed automatically and shaken to secure the required density.

MAINTENANCE MEN PRESENT WAGE DEMANDS

Revision of Working Rules and Large Increases in Pay Are Urged in Plea Submitted to Wage Board

THE DEMANDS of the organized maintenance of way employees for general increases in wages were submitted to the Railroad Labor Board at Washington on May 4 by E. F. Grable, president of the United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers. With some modifications they are the same as those presented to the Railroad Administration last summer on which a hearing was held before the Board of Railroad Wages and Working Conditions, but at the request of the President they were held in abeyance for a time and renewed with a threat of a strike unless they were granted early this year. Mr. Grable also asked that the national agreement executed by his organization and the director general of railroads be continued, with some modifications which he proposed, by an order of the board and that the new rates of pay which he asked be incorporated therein. E. T. Whiter, chairman of the railroad conference committee, objected to the consideration by the board of any of the modified demands which had not been submitted to the railroads, but it was explained that these demands had been served on each individual road on April 28 and that a report of the results would be submitted to the board.

On Monday, May 17, the board began its hearings at Chicago, the official place of meeting under the law. It is expected that the board will remain in session daily until an award is made. What the demanded increases will mean when considered in the aggregate is seen in the table below, which was prepared by Mr. Whiter. This shows that the amount demanded by the maintenance of way men represents a larger total than for any other class of employees.

Class of Employees.	1919 Payroll.	——Increase Asked—— Amount.	Per Cent.
Clerks	$ 415,163,018	$ 175,098,406	42.17
Maintenance of way men.	634,627,732	421,357,046	66.4
Shop	721,468,190	162,734,357	25.3
Telegraphers	89,957,985	43,415,145	48.2
Engine and train	672,489,869	276,872,123	41.2
Total	$2,533.706,794	$1,079,477,077	32.6
Marine employees		681,760	
		$1,080,158,837	

This does not include employees not involved in the demands, whose salaries and wages amount to about $211,000,000 a year, the total pay roll for 1919 being $2,744,000,000.

The proposed agreement is more drastic in its provisions than the one now in effect. In many cases the changes are merely in the wording, but a number of paragraphs have been added or old ones modified to introduce some marked changes from the old agreement. Probably the most important of these is Section 1 of Article III relative to the basis of promotion. In the old agreement the management was the sole judge on questions of seniority and ability, but in the proposed rules such questions are to be submitted to a joint committee of management and employees. Another departure appears in Section 18 of Article VI, which prohibits the dismissal of any employee who has worked 30 days for incompetency without an investigation.

Under the heading of compensation, time and one-half for Sundays and holidays is provided, more rigid lines are drawn for the periods of starting and stopping work and for lunch hours and the compensation for employees required to report for work which is not performed is increased from three to five hours.

Further concessions are required for the foreman, such as compensating him on the time and one-half basis for any time required outside of working hours to do the clerical work which his position demands. Also in Section 12 of Article VI provision is made for furnishing section and yard foremen with houses at an annual rental of not to exceed $1 per year. Section 3 of Article VI provides specifically for pass privileges to employees in accordance with various tenures of service, while brotherhood officers of various grades are to be provided with railroad and Pullman annuals.

The proposed rules are also much more specific as regards the housing facilities and sanitation. Thus, Section 4 of Article VI requires 325 cu. ft. of clear space for each man in sleeping quarters and also requires a car fitted with a bat tub and means of heating water for bathing. Section 15 of Article VI prohibits the requiring of personal injury releases and Section 23 eliminates physical examinations other than eyesight and hearing tests where these are essential to the duties performed.

The rules in full, as submitted, are as follows:

PROPOSED AGREEMENT

ARTICLE I—SCOPE

These rules govern the hours of service and working conditions of all employees in the Maintenance of Way Department, not including supervisory forces above the rank of General Foreman; including all Shop, Roundhouse, Stores, Yard, Rail, and Saw Mill Employees, including their Gang Leaders, Power Plants, Timber Treating Plants, Ice Plants and Houses, Fuel Department, Pumping Stations and all composite mechanics and other employees not specifically mentioned in the above departments or right of ways.

It being understood and agreed that the intent of these rules is to cover all employees in the departments above mentioned who were not represented by other organizations prior to September 1, 1918.

ARTICLE II—SENIORITY

SENIORITY DATUM

Section 1. Seniority begins at the time the employee's pay starts.

Section 2. Rights accruing to employees under their seniority entitles them to consideration for positions in accordance with their relative length of service with the railroad, as hereinafter provided.

LIMITS

Section 3. Seniority rights of all employees are confined to the sub-department in which employed.

RIGHT OF LABORERS

Section 4. Seniority rights of laborers as such will be restricted to their respective gangs; when reduced, laborers affected may displace laborers junior in service under one supervisor or other corresponding officer.

Section 5. Seniority rights of laborers to promotion will be restricted to the territory under one division superintendent, or one master mechanic, and general storekeeper.

RIGHTS OF OTHERS THAN LABORERS

Section 6. Seniority rights of employees of higher rank than laborers to new positions or vacancies will be restricted to the territory over which one superintendent, one division engineer, one master mechanic, or one general storekeeper, has jurisdiction. When force is reduced, foremen and other mechanics will have the right, before displacing other employees, to displace only foremen and other mechanics with the least seniority rights on their respective seniority districts.

Example—Bridge and Building Department to be confined to one master carpenter, or corresponding officer. Track Department to be confined to Division Superintendent or other corre-

sponding officer. Mechanical Department to be confined to one master mechanic or other corresponding officer. Stores Department to be confined to General Storekeeper or other corresponding officer.

IN TEMPORARY SERVICE

Section 7. Employees assigned to temporary service may, when released, return to the position from which taken, without loss of seniority.

ROSTERS

Section 8. Seniority rosters of employees of each sub-department by seniority districts will be separately compiled. Copies will be furnished foremen and employees' representatives and be kept at convenient places available for inspection by employees interested.

SCOPE OF ROSTER

Section 9. Seniority rosters will show the name and date of entry of the employees into the service of the railroad and date of promotion except that names of laborers will not be included and their seniority rights will not apply until they have been in continuous service of the railroad in excess of six months.

ROSTER REVISION

Section 10. Rosters will be revised in January of each year and will be open to correction for a period of 60 days thereafter.

LEAVE OF ABSENCE

Section 11. Employees given leave of absence in writing by proper authority of the railroad, for six months or less will retain their seniority. Employees failing to return before the expiration of their leave of absence will lose their seniority rights, unless an extension has been obtained.

NOTICE OF DESIRE TO RETAIN

Section 12. When employees laid off by reason of force reduction desire to retain their seniority rights, they must file with the officer of the sub-department notifying them of the reduction, their address, and renew same each 60 days. Failure to renew the address each 60 days or to return to the service within 15 days after being so notified will forfeit all seniority rights.

RETENTION IN TRANSFER

Section 13. Employees temporarily transferred by direction of the management, from one seniority district to another, will retain their seniority rights on the district from which transferred.

CHANGE OF DISTRICT

Section 14. In case of change in seniority districts a relative proportion of the total employees affected will be transferred to and their seniority rights adjusted in the revised districts by the management with a properly constituted committee representing the employees.

EXPENSE

Section 15. Employees accepting positions in the exercise of their seniority rights, will do so without causing extra expense to the railroad.

ARTICLE III—PROMOTION

BASIS OF PROMOTIONS

Section 1. Promotions shall be based on ability, merit and seniority, ability and merit being sufficient, seniority shall prevail. If question arises as to employee's ability to fill position a committee of three employees appointed by the General Chairman or Vice-Chairman of the U. B. M. W. E. & R. S. L., together with a like committee appointed by the management, shall investigate and make decision on question involved.

VACANCIES AND NEW POSITIONS

Section 2. In transferring employees to fill vacancies or new positions, the provisions of Section 1 of this article will apply.

LIMITS

Section 3. Employees are entitled to promotion in the sub-department over which their seniority rights prevail.

DECLINING

Section 4. Employees declining promotion shall not lose their seniority except to the employee promoted and only in the next higher rank of service.

FAILING TO QUALIFY

Section 5. Employees accepting promotion and failing to qualify within 30 days may return to their former position without loss of seniority.

BULLETIN FORCES

Section 6. New positions and vacancies, including temporary vacancies, shall be bulletined within 30 days previous to or following the dates such vacancies occur.

HOW MADE

Section 7. Promotions to new positions or to fill vacancies will be made after bulletin notice has been posted for a period of 10 days at the headquarters of the gangs in the sub-department of employees entitled to consideration in filling the positions, during which time employees may file their applications with the official whose name appears on the bulletin. The appointment will be made before the expiration of 30 days from the date the bulletin is posted, and the name of the employee selected will then be announced. New positions or vacancies may be filled temporarily pending permanent assignment; copy of bulletin notice to be furnished to the chairman of local grievance committee.

ARTICLE IV—DISCIPLINE AND GRIEVANCES

ADVICE OF CAUSE

Section 1. Employees disciplined or dismissed shall be advised of the cause in writing at time dismissed.

HEARING

Section 2. An employee represented by this organization, disciplined, or who feels unjustly treated, shall upon making a written request to the immediate superior within 10 days from date of advice, be given a fair and impartial hearing within 10 days thereafter and a decision will be rendered within 20 days after completion of hearing.

Such employees may select not to exceed three employees to assist at the hearing.

TRANSCRIPT

Section 3. A transcript of an employee's evidence in writing will be furnished only to such employees upon verifying and signing same.

COPIES FOR COMMITTEE

Section 4. A copy of all the evidence taken in writing at the hearing will be promptly made available for use of a properly constituted committee when required in handling cases on appeal.

Duly accredited committee means a local committee of the organization, General System Division Committee, Chief Executive Officer, or his authorized representative.

APPEALS

Section 5. An employee dissatisfied with a decision will have the right to appeal in succession up to and including the highest official designated by the management to handle such cases; if notice of appeal is given the official rendering the decision within 10 days thereafter.

The right of the employee to be assisted by the duly accredited representatives of the employees is recognized.

EXONERATIONS

Section 6. If the charge against the employee is not sustained, it shall be stricken from the record. If by reason of such unsustained charge the employee has been removed from position held, reinstatement will be made and payment allowed for the assigned working hours actually lost while out of service of the railroad at not less than rate of pay of position formerly held or the difference in rate of pay earned if in the service.

PENDING DECISION

Section 7. Prior to the assertion of grievances as herein provided and while questions of grievances are pending, there will neither be a shut-down by the employer nor a suspension of work by the employees.

LEAVE OF ABSENCE

Section 8. Employees serving on committees on sufficient notice shall be granted leave of absence and free transportation. Employees called to testify as witnesses, in case of trial or investigation of other employees, by either committee or railroad officials, shall be compensated for all time lost on account of such trial or investigations; compensation to be paid by railroad company.

ARTICLE V—COMPENSATION

A DAY'S WORK

Section 1. Eight consecutive hours exclusive of the meal period shall constitute a day's work.

CONTINUOUS HOURS SERVICE

Section 2. For regular operations requiring continuous hours, eight consecutive hours shall constitute a day's work, in which

case not to exceed 20 minutes shall be allowed in which to eat, without deduction in pay.

HOURS PAID FOR

Section 3. Regularly established daily working hours will not be reduced below eight to avoid making force reductions.

SUNDAY WORK

Section 4. Time worked on Sunday and the following holidays, New Year's, Washington's Birthday, Decoration, Fourth of July, Labor Day, Thanksgiving and Christmas or any other holidays that may be made legal from time to time shall be paid for at the rate of time and one-half.

In the event that any of the above recognized holidays fall on Sunday, the following Monday shall be recognized as a holiday.

OVERTIME

Section 5. Overtime for all employees covered by this agreement shall be computed after the eight hours of continuous service exclusive of the meal period, at the rate of time and one-half time on the actual minute basis, whether working, waiting, or traveling.

CALLS

Section 6. Employees called or required to return to work will be allowed five hours for three hours and twenty minutes or less. They shall be required to do only such work as called for.

BEGINNING AND END OF DAY

Section 7. Employees' time will start and end at designated tool houses, outfit cars and shops. For regular road service employees not in outfit cars, such starting time and ending time shall be at designated home station.

STARTING TIME

Section 8. (a) When one shift is employed, the starting time shall be not earlier than 7 o'clock, and not later than 8 o'clock. The time and length of the lunch period shall be subject to mutual agreement.

(b) Where two shifts are employed, the starting time of the first shift shall be governed by (a) of this section and the second shift shall start immediately following the first shift, or at 8 p. m.

The spread of the second shift shall consist of eight consecutive hours, including an allowance of 20 minutes for lunch within the limits of the fifth hour.

(c) Where three shifts are employed, the starting time of the first shift shall be goverened by (a) of this section, and the starting time for each following shift shall be regulated accordingly.

The spread of each shift shall consist of eight consecutive hours, including an allowance of 20 minutes for lunch within the limits of the fifth hour.

MEAL PERIOD

Section 9. (a) When a meal period is allowed, it will be between the ending of the fourth hour and beginning of the sixth hour after starting work, unless otherwise agreed upon by the employees and employer.

(b) If the meal period is not afforded within the allowed or agreed time limit and is worked, the meal period shall be paid for at the overtime rate and 20 minutes with pay in which to eat shall be afforded at the first opportunity.

(c) Unless acceptable to a majority of the employees directly interested, the meal period shall not be less than 30 minutes nor more than one hour.

DETERMINING HOURLY RATES

Section 10. To determine the hourly rate for positions held by monthly paid employees multiply the regular monthly rate in effect by 12, divide by 306, the regular assigned work days of a year, and divide this quotient by 8.

In determining the hourly rate, fractions less than one-fourth of one cent shall be as one-fourth of one cent; over one-fourth and under one-half as one-half cent; over one-half and under three-quarters, as three-fourths; over three-fourths as one cent.

TRAVEL TIME IN CAMP CARS

Section 11. Employees required by the management to travel on or off their assigned territories in boarding cars will be allowed straight time traveling during regular working hours, and overtime rates for all overtime hours, including Sundays and holidays.

AUTHORITY FOR OVERTIME

Section 12. No overtime hours will be worked without authority of a superior officer, except in case of emergency, where advance authority is not obtainable.

SUPERVISORY EMPLOYEES

Section 13. Supervisory employees will be allowed time during regular working hours to do necessary clerical work in connection with their supervisory duties; when required by the management to do clerical work, after regular working hours, the overtime provisions of this agreement shall apply.

ASSIGNMENTS TRAVELING

Section 14. Employees temporarily or permanently assigned to duties requiring variable hours, working on or traveling over an assigned territory and away from and out of reach of their regular boarding and lodging places or outfit cars, shall be paid actual expenses and overtime as provided in these rules, whether waiting, working, or traveling.

REPORTING AND NOT USED

Section 15. Employees required to report at usual starting time and place for the day's work, and when conditions prevent work being performed, shall be allowed a minimum of five hours. If required to perform work, shall be paid for full day.

ABSORBING OVERTIME

Section 16. Employees will not be required to suspend work during any regular assigned work period for the purpose of absorbing overtime.

REDUCTION IN FORCES

Section 17. Employees will not be laid off for short periods where proper reduction of expense can be accomplished by first laying off the junior men. Five days' notice will be given men affected before reduction is made and lists will be furnished local committee.

MEALS AND LODGINGS

Section 18. Employees required to perform work on or off their regular assigned territory and away from their regular boarding and lodging places and outfit cars will be furnished with meals and lodging at the railroad's expense.

This rule not to apply to mid-day lunch customarily carried by employees.

WITNESSES

Section 19. Employees taken away from their regular assigned duties at the request of the management to attend court or to appear as witnesses for the railroad, will be furnished transportation and will be allowed compensation equal to what would have been earned had such interruption not taken place and in addition, necessary, actual expenses while away from headquarters, and any fees or mileage accruing will be assigned to the railroad.

COMPOSITE SERVICE

Section 20. An employee working on more than one class of work on any day will be allowed the higher rate of pay for the entire day. When temporarily assigned by the proper officer to lower rated positions, his rate of pay will not be reduced.

FEMALE EMPLOYEES

Section 21. The pay of female employees for the same class of work shall be the same as that of men and their working conditions must be healthful and fitted to their needs. The laws enacted for the government of their employment must be observed.

ARTICLE VI

PASSES

Section 1. Employees serving on committees will be granted leave of absence and free transportation, when called for committee work.

CONSENT TO TRANSFER

Section 2. Only in case of emergency shall employees be transferred to another division unless they so desire.

PASSES

Section 3. Upon request, any employee after a service of 30 days will be furnished free transportation for himself and family, over their respective superintendent's district; after a period of six months over the entire system; after a period of one year over foreign lines. Employees acting in capacity of General Chairman, Assistant Chairman, Vice-Chairman and Secretary of the Joint Protective Board of the United Brotherhood of Maintenance of Way Employees & Railway Shop Laborers, who are devoting their time to representing the employees coming under provisions of this agreement, upon request will be furnished annual railroad and Pullman transportation over their entire system and short cuts on connecting lines.

OUTFIT CARS

Section 4. Camp cars shall be maintained in good and sanitary

conditions. All cars must be sealed and screened (except tool cars). All camp cars will be equipped with springs consistent with safety and character of car and comfort of employees. Foremen must and will be allowed time in which to keep cars in clean and sanitary conditions. Camp cars to be equipped by the company with sanitary steel bunks with springs, stoves and lamps. Cook cars equipped with cooking stoves and necessary cooking utensils. Dining cars shall be furnished with dishes to accommodate the number of men worked, fuel and oil shall be furnished by the railroad. Not more than one man to each 325 cu. ft. of clear space shall be allowed in each sleeping car. Each outfit will be furnished with a car equipped with a bath tub and means of heating water for bathing purposes.

COOKS

Section 5. In camps or cars where the road service is of transitory character and when there are six or more men in gang a cook shall be furnished at the expense of the railroad. Where less than six men are employed one man shall be allowed sufficient time at the railroad's expense to prepare the meals.

WATER

Section 6. The railroad will see to it that an adequate supply of water suitable for domestic uses is made available to employees living in its buildings, camps and outfit cars. Where it must be transported and stored in receptacles, they shall be well adapted to the purpose.

WEEK END VISITS

Section 7. Employees will be allowed to make week end visits to their homes. Free transportation will be furnished upon request, and employees will be allowed straight time one way while traveling.

TOOLS

Section 8. The railroads will furnish the employees such general tools as are necessary to perform their work, except such tools as are customarily furnished by skilled workmen.

TRANSFERRING HOUSEHOLD GOODS

Section 9. Employees transferred from one location to another by direction of the management or in exercising their seniority rights, will be entitled to move their household effects without payment of freight charges.

CHECKING IN AND OUT

Section 10. Employees who are required to check in and out on their own time will be paid one hour extra at the close of each week regardless of the number of hours worked during the week.

WORK IN EXCESS OF SIXTEEN HOURS

Section 11. Employees shall be paid double time for all time held on duty in excess of sixteen hours.

SECTION HOUSES

Section 12. All regular section and yard foremen shall be furnished houses at an annual rental not to exceed one dollar per year, and such houses will be maintained in good and sanitary condition by the railroad.

Section 13. Employees laid off on account of reduction in force, who desire to seek employment elsewhere will, upon application, be furnished with a pass to any point desired on the same railroad.

Section 14. Mechanics of one craft shall in no case be required to perform the duties of mechanics of another except in case of absolute emergency.

PERSONAL INJURIES

Section 15. Employees injured while at work will not be required to make accident reports before they are given medical attention, but will make them as soon as practicable thereafter. Proper medical attention will be given at the earliest possible moment, and employees shall be permitted to return to work without signing a release pending final settlement of the case.

APPRENTICESHIP

Section 16. Any employee above the rank of laborer who has served three years at his trade shall be classified and paid as a mechanic.

PAYING OFF

Section 17. Employees will be paid off during their regular working hours, semi-monthly, except where existing state laws provide a more desirable pay-off condition. Should the regular pay day fall on a holiday or days when the employees are working they will be paid on the preceeding day. Where there is a shortage equal to one day's pay or more in the pay of an employee a voucher will be issued to cover the shortage.

Section 18. An employee who has been in the service of the railroad company 30 days shall not be dismissed for incompetency, neither shall an employee be discharged for any cause without first being given an investigation. Employees leaving the service of the company will be furnished with a time due within 24 hours where D. C. checks are issued and within 48 hours at other points, or earlier when possible.

GRAND LODGE REPRESENTATIVES

Section 19. Any bona fide representative of the Grand Lodge of the U. B. M. W. E. & R. S. L. shall be entitled to represent any employee or any committee upon presentation of proper credentials.

PREVIOUS AGREEMENTS OR PRACTICES

Section 20. On roads where an agreement or practice more favorable to the employees has been in effect such agreement or practice shall be retained.

DISSIMILAR CONDITIONS

Section 20a. Where there are dissimilar conditions existing on the various railroads and not provided for by this agreement, the General Committee of that particular road shall be permitted to amend such conditions above referred to, *provided, however,* this does not change the proposed established rate of pay.

PRINTING SCHEDULE

Section 21. This schedule of working conditions shall be printed by the railroad and any employees affected thereby shall be provided with a copy upon request.

CONTROVERSIES

Section 22. Controversies arising over the application of this schedule of working conditions shall be referred to Railway Board of Adjustment No. 3, in accordance with the provisions of General Order No. 53.

APPLICANTS FOR EMPLOYMENT

Section 23. Applicants for employment will be required to make statement only as to their ability and address of relatives, except when their duties require them to distinguish signals or do flagging when they shall be required to pass the usual eye-sight and hearing tests.

EMERGENCY CASES

Section 24. Emergency cases shall be construed to mean only the following: Fires, washouts, broken rails or switches, or conditions that may stop traffic.

DATES EFFECTIVE AND CHANGES

Section 25. This schedule of hours of service and working conditions takes effect....., and there will be no change in it until after 30 days' notice has been given in writing by either party to the other.

PROPOSED WAGE SCALE

For All Employees in the Bridge and Building Department

All general bridge and building foremen, per month.....$270
All bridge and building house carpenter foremen, month....$250
All painter, tinner, water supply, brick and concrete, cabinet and bench carpenter, steel bridge and steel tank foremen, month $250
Fence gang foremen, month.....$228
Tunnel foremen, month.....$250
Paver foremen, month.....$208
Pile driver foremen, month.....$270
Rail and saw mill foremen, month.....$250
Assistant fence gang foremen, hour.....90 cents
Wire fence gang men, hour.....67 cents
Water treaters, hour.....75 cents
Steam shovel engineers, hour.....92 cents
Steam shovel cranemen, hour.....85 cents
Steam shovel pitmen, hour.....67 cents
Steam shovel firemen, hour.....67 cents
Pumps, hour .....70 cents
Hand drawbridge and incline tenders, hour.....67 cents
Assistant drawbridge and incline tenders, hour.....62 cents
Pile driver, derrick and hoisting foremen, hour.....67 cents
All bridge and building carpenters, painters, masons, bricklayers, plasterers, apprentices and helpers, hour.....67 cents
All assistant carpenter, painter, mason, tinner, water supply, brick and concrete, bench carpenter, cabinet, steel bridge and steel tank and concrete, tunnel, derrick foremen, hour $1
All scale, bridge, building, water and fire inspectors, hour.....$1
All pile driver, derrick, hoisting and steam crane engineers, hour .....90 cents
All mechanics in the maintenance of way department, hour.85 cents

Drawbridge tenders, power and drawbridge engineers, track pan pumpers, hour ..... 85 cents
Sign painters, hour ..... 90 cents
Assistant power drawbridge tenders, hour ..... 80 cents
All stationary firemen, hour ..... 67 cents
All derrick watchmen, pile driver watchmen, steam shovel watchmen, hour ..... 65 cents
All camp car cooks, hour ..... 62 cents
All camp car cookees, hour ..... 57 cents
All powder men, hour ..... 90 cents
Motor car operators and chauffeurs, hour ..... 85 cents
Assistant motor car operators and chauffeurs, hour ..... 67 cents
Yard, warehouse and station watchmen, hour ..... 67 cents
Sawyers, hour ..... 85 cents
Uniform patrolmen, hour ..... 75 cents
Pavers, hour ..... 75 cents
Cradle tenders, hour ..... 67 cents
Tunnel miners, hour ..... 85 cents
Tunnel muckers, hour ..... 67 cents
Tunnel inspectors, hour ..... 75 cents

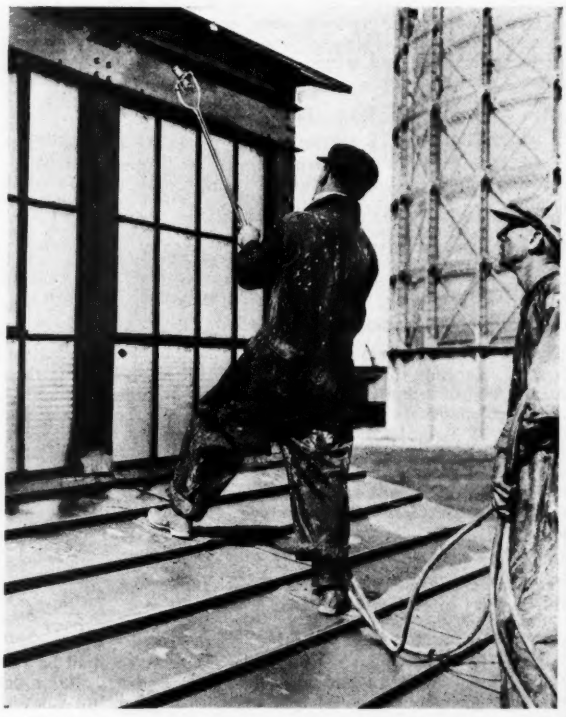
Rates for Track Department

Rail and ballast gang foremen, over 60 men, month $250
General foremen and switch foremen, month $250
Rail and ballast gang foremen with less than 60 men, month. $240
Regular extra-gang and work-train foremen, month $250
First class yard foremen, month $228
Second class yard foremen, month $218
Section and relief foremen, month $208
Section foremen with tunnels 500 feet or more, month $218
Trackmen in tunnels 500 feet or over, hour ..... 68 cents
Timber treaters, hour ..... 68 cents
Regular trackmen, hour ..... 65 cents
Track walkers or inspectors, hour ..... 68 cents
Assistant extra-gang foremen, assistant yard foremen, hour ... $1
Track apprentices and assistant section foremen, hour .... 67 cents
Track watchmen and lamp tenders, hour ..... 60 cents
Track watchmen in tunnels, hour ..... 63 cents
Crossing flagmen, hour ..... 60 cents
Crossing flagmen in uniform, hour ..... 65 cents
The differential in favor of mountain and grade sections now in effect shall be maintained. Foremen and men operating snow-plow or flangers shall be paid for their services at the regular rate plus $1 for each eight-hour day or fraction thereof while on trip.

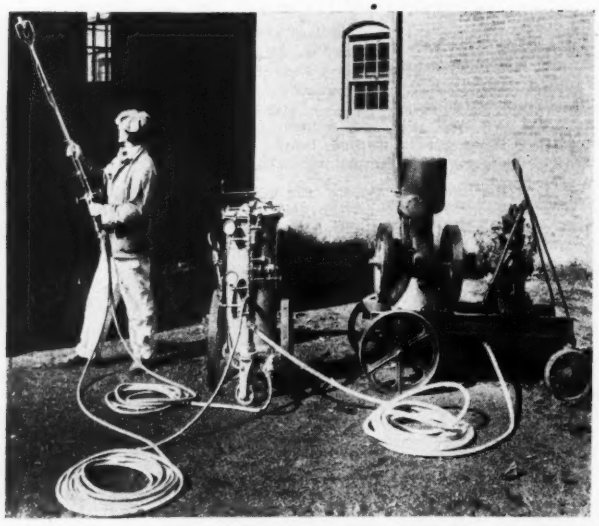
AN ENCLOSED JET PAINT SPRAYER

MAINTENANCE of way officers who are charged with responsibility for the economical conduct of painting operations in the face of the present inefficiency of painting forces will be interested in a paint sprayer recently placed on the market which embodies a number of new ideas. The principal innovation consists in the ejection of a stream of paint from the nozzle surrounded by a jacket of compressed air, which leaves the nozzle at a pressure of 60 lb. per sq. in. It is claimed that this cone of compressed air prevents wastage of the paint by spattering or the formation of clouds. As shown in the photograph, the air and paint are delivered to the nozzle through separate conduits which come together at a T-connection where the paint is carried through a central tube to a central opening in the nozzle, while the air is discharged from an annular opening surrounding the paint outlet so the stream of paint is completely surrounded by the stream of air. Ready adjustment for the relative discharge of paint and air is provided, while the stopping and starting of the discharge is controlled by a trigger.

Among the claims made for this type of paint sprayer, which is known as the Vortex, manufactured by the Vortex Manufacturing Company, Cleveland, Ohio, are: (1) It carries a large volume of paint owing to the fact that it does not produce a finely divided spray, but applies a relatively heavy liquid; (2) it insures good penetration of rough surfaces because of the brushing effect of the high pressure air discharge; (3) it has a wide range of use through provision for a 12-ft. arm when desired. This does away with the use of ladders and scaffolds in many cases. The complete outfit includes an air compressor driven by a gasoline engine mounted on a truck and a paint reservoir pressure tank, also mounted on wheels. The latter may be secured in capacities of 15 gal. of paint and upward.



The Nozzle, the Paint Pressure Tank and the Air Compressor Set



The Sprayer in Use

It is stated that 2,000 sq. ft. of surface or more may be covered per hour with the Vortex painter on plain interior work where conditions are favorable and the operator experienced at his task. It is also said that interior painting may be performed by novices at the rate of 1,000 to 1,600 sq. ft. per hour. Panels 104 sq. ft. in size have been painted by two men at an average of 35 min. per panel for a single coat, while a water tank on the roof of a building having 3,500 sq. ft. of surface was coated in 3½ hr.

THE PROBLEMS OF THE SUPERVISORY OFFICER*

Complex Labor and Material Conditions Increase the Need for Adequate Supervision in Maintenance Work

BY W. J. BACKES,
Engineer Maintenance of Way, New York, New Haven & Hartford, New Haven, Conn.

THE NEW conditions which have arisen on the railroads have brought about many changes in the responsibilities of supervisory officers which can be best illustrated by outlining their duties in general and then reviewing the conditions, both past and present, which have influenced these changes.

In general the supervisory officer must give consideration to the following elements which enter into his responsibilities and duties:

1. Labor conditions. Under this head the matters which give him the greatest concern are its availability, character, availability of material for promotion, training necessary to carry out work efficiently and creation of an esprit de corps among the personnel.
2. Material conditions. Availability, use and character.
3. Accounting for expenditures. Under this heading comes compliance with the accounting requirements of the Interstate Commerce Commission and the maintaining of a proper record of costs.
4. Co-ordination of the use of labor and material. This embraces the planning of work and the use of labor-saving devices.

Labor is the most essential element in the carrying on of all industrial enterprises and the savings that can be made in its use should, of necessity, be given continuous attention on the part of supervisory officers. The consideration that must be given to labor from the standpoint of availability, character, influence of wage orders, education along the line of the particular endeavor in which it is to be used, and the creation of an esprit de corps among the men by the supervisory officers, makes it essential that these officers shall be men capable of dealing in a thorough manner with the problems that arise from the complexity in the labor situation.

FORMERLY A SURPLUS OF LABOR

In the past we have had a sufficiency, if not a surplus, of labor, and the supervisory officer was able in a general way to select the men to enter the service. The rates paid by the railroads were generally equal to or only slightly less than those paid by contractors and outside industrial concerns, but on the other hand, the railroads offered more continuous employment. Where there were shortages of labor, men were easily recruited through the padrone system.

Today the responsibility of the supervisory officer in the selection of his men places a heavier burden upon him than it did in the past, as the likely material available at that time was greater, and his time for the consideration of other matters correspondingly increased. There is now a marked shortage of all classes of labor and consequently he must use such men as he is able to obtain, in the face of the higher rates of wages paid on the outside, which naturally attract the best men; also in the face of a disposition on the part of labor today to disregard permanency of employment, it being willing to take a chance that the shortage will continue and that there will always be a job available. If they do not like the wages or the conditions under which they are working at the moment they make a change. It is, therefore, important that those who are responsible for the hiring of men select as far as possible those who show a desire for permanent employment and encourage them to remain in the service.

The day has gone by when a foreman can bully his men in order to obtain the maximum amount of work in a given period of time. The great essential in holding men of any class is a disposition to be absolutely fair with them under all circumstances and to give them the benefit of the doubt where there is any. If the good-will of the men can once be obtained, fruitful ground has been prepared for further encouragement of the men to remain in the service. This is exemplified in a measure in camps which are recruited with men of the "boomer" class, where there is a continual turnover, representing an average of almost a complete new gang once every two weeks. Even in these gangs there are always a certain number, say from 15 per cent to 20 per cent, who remain continuously, and if the foremen or supervisors will use these men as a nucleus from which to build up their gangs by giving their comforts and needs personal attention, a better showing will generally be made. Men cannot be held if proper quarters and wholesome food are not provided and these must always be given personal attention on the part of the foreman or supervisor. It is generally agreed that the boomer, or any form of imported labor in quantities, is not the equal of the labor which the railroads had prior to the war, but the boomer is the only available source of labor in quantities with the possible exception of negroes, Mexicans and Spaniards.

The turnover of negro labor has been less than that of the boomer, but the greatest difficulty experienced in connection with their use is the finding of foremen, in our part of the country, who can get the most out of them. It is my understanding that the experience with Mexicans on other roads has been somewhat similar to ours with the negroes.

THE SPANIARDS COMPRISE A NEW CLASS

The Spaniards are a new group which are coming into the country in quantities. They are handled in a slightly different manner, in that they have a Spanish-speaking foreman and will largely take care of themselves in the same manner as the Italians, provided a store can be established to furnish them with the kind of food that they are accustomed to.

There is a tendency on the part of many foremen and supervisors, where men are furnished in quantities from outside sources, to relax in their efforts to obtain men locally and overlook the advantage that is gained by having men under them that they have hired themselves, and over whom as a consequence they are able to exercise greater influence.

The older mechanics have generally remained in the service of the railroads, but the younger men have practically all gone into the industries where higher rates of wages are paid, and the element that has been recruited to fill the vacancies has been of a much inferior class. Here again the responsibility of making a selection rests with the foreman and the supervising officer to see that the best available material is secured. This can be accomplished only by constant vigilance and encouragement on

*A paper presented before the New England Railroad Club, Boston, Mass., on May 11.

the part of the foremen, through making it attractive for desirable young men to enter the service of the railroads.

In the past the railroads have been free to fix wages and to adjust any inequalities. Thirty years ago the rates paid by the railroads were probably equal to those paid by outside industries and attracted the better class of mechanics and laborers on account of the more favorable working conditions. The railroads, however, did not increase wages at the same rate as outside industries, so that, prior to the war, they were at a slight disadvantage. War conditions created a still greater difference between these rates, which the government, during federal control, endeavored to correct through its wage orders. The maintenance of way department was the last to be given consideration. The delays in making decisions and knowledge that men in other departments around them were receiving increases, with no consideration apparently being given to their cases, caused serious dissatisfaction among the men, and resulted in the loss of a considerable number. This was a condition over which the supervisory officers had no control.

They were put in a further embarrassing position on account of the wage orders being in the hands of the men before they were in the hands of the officers of the railroads. This, in the minds of many of the men, placed the officers in the position of failing to comply with the government's orders, when, as a matter of fact, the government had not issued its orders to the officers of the railroads to put them into effect. In many cases this had a tendency to make the men suspicious of their officers, especially in view of the fact that the latter were not in a position to make an explanation. This increased the burden of the supervisory officer in maintaining the goodwill he had tried so hard to establish. It is most essential that the supervisory officer give earnest and constant attention to restoring the feeling of confidence which formerly existed.

The character of labor available in years past was materially different from that of today, the majority of the men being English-speaking. It was possible, therefore, by talking to the men to obtain a better knowledge of their character and experience, making it possible for the supervisory officers to obtain a better selection and build up a stronger organization. Today the majority of the labor is foreign-born and, on account of inability to speak the English language, it is more difficult to determine its character and capability, and also more difficult to train the men for the work in the railroad service. With the large turnover in boomer labor, it is safe to say the boomer never becomes thoroughly trained in railroad work and as a consequence serious loss in efficiency results, increasing the responsibility of a supervising officer.

The whole problem of holding men continuously in the service has been one of the most discouraging that the supervising officer has been compelled to contend with, as he has a feeling of wasted effort through men leaving as soon as they reach any degree of proficiency. The holding of men has seemed a hopeless task; nevertheless, many foremen and supervising officers, who in the past have consistently carried on a policy of selecting young men and training them in the service, are still in a position, when occasion demands, to furnish men from their organization who are ready for promotion. This has been accomplished largely by care in the selection of the young men to be trained and by personal observation and contact on the part of the supervisory officer, as well as the foreman. This cannot be done with as great ease as in the past on account of the increased duties of the supervising officer; nevertheless, his burdens can be lightened greatly if he will take the time to surround himself with men who are trained by him, and by pointing out to these young men the many opportunities in railroad service, which are represented by constancy of service and opportunity of promotion.

It was the practice of former years on many railroads to place all materials in the charge of the supervising officers who originated the requisitions, the material being forwarded direct to them by the manufacturer. This increased their responsibility so far as maintaining a proper stock and having sufficient materials on hand, but it made it possible for them to plan their work. On the other hand, it resulted in the maintenance of a large stock of material whose availability was reduced on account of its being distributed over the entire road, as compared with the practice of maintaining a stock at two or three central points. The reducing of stocks by concentration has resulted in the placing of the responsibility for maintaining an adequate supply of material upon the stores department on the majority of railroads and also has resulted in the supervising officers being entirely relieved of any responsibility in connection with obtaining material. However, the fact that a supervising officer has made a requisition for material should not relieve him of the responsibility of following up to see that the material is obtained when needed. It also should not relieve him of so laying out his work from month to month upon the basis of using the materials he has on hand and those he is absolutely sure of receiving.

ECONOMY IN USE OF MATERIAL

With the higher cost of labor and material it is doubly important that a definite plan or program be outlined in order that there may be no waste of labor, which today represents nearly 65 per cent of the cost of doing a piece of work, as against 45 per cent prior to the war. With the plan of handling material by the stores department it is absolutely necessary that the highest degree of cooperation exist between the two departments, and although the responsibility of the supervisor for securing the material may be reduced, his responsibility in connection with the carrying out of the work is greatly increased, particularly the responsibility of assembling all the materials required for the carrying on of a piece of work and having them ready for use at the proper time in connection with the labor program. It is extremely important to see that the materials furnished are of a character suited to the work and of the dimensions and sides which will reduce the amount of labor to be consumed to a minimum. On the other hand, where stock material on hand can be used to proper advantage this should in all cases be done, although the best measure of the advisability of using such material is the comparative cost of doing the work with materials to size as against odd materials obtained at lower prices, consideration being given to the extra labor costs and the value of the waste material. Especial attention must be given to the utilization of second-hand materials released during reconstruction, and care should be exercised in removing them for considerable money can be saved by planning for the use of such material.

On many roads in years gone by the accounting system was more or less lax in handling charges for expenditures. Many charges which today are made to capital account were formerly charged to operating expenses, relieving both the foreman and the supervisor of the responsibility of keeping a detailed record of expenditures and of making the many complicated distributions to the various accounts.

At the present time it is necessary for all to conform to the accounting required by the Interstate Commerce Commission. This requires careful study and constant attention to the modifications that are made in the orders, and

it is essential that the supervising officers be thoroughly familiar with these requirements and see that the foremen carry out their provisions. Much needless correspondence and lost time can be saved in making up the distribution of payrolls and material charges if these matters are thoroughly understood by the men down the line. It is not necessary in all cases that the men be familiar with all the requirements, but they must at least have a thorough knowledge of the requirements in so far as the charges for which they are directly responsible are concerned. These requirements have added not a little to the responsibility of the supervising officers, and, as these requirements will, no doubt, become more burdensome as time goes on, it is doubly important that these instructions be constantly studied and kept in mind.

EFFICIENCY MUST BE INCREASED

The old time supervisors made it a practice to keep fairly complete records of the costs of handling work under their jurisdiction, but this was entirely of a personal nature, being done for their own information. At present, the time of the supervisors is so taken up by the large volume of information required in conformity to the Interstate Commerce Commission classification of accounts that little time is left to obtain cost data of the actual units and details of work performed. Unfortunately many of the Interstate Commerce Commission subdivisions do not require the information in a form that makes it possible to work up details without going through a large number of timebooks. In many instances it is necessary to have information that is not even provided for in the timebooks. With the substantial increase in the costs of labor and the increase and fluctuation in the costs of materials, it has been no small task to make dependable estimates on work to be done, although one of the most important functions of a supervisory officer is to have a thorough knowledge of the cost of the work performed under his charge. With proper cost data it is possible to compare the efficiency of one gang with another, giving proper consideration to local conditions, and in that way set up a measuring stick through which a friendly rivalry can be created between the forces under his jurisdiction, which will go far toward interesting the men in their work and in obtaining results which are consistent with true economy. The day is not far distant, if it is not already here, when it will be necessary for all of us who have any responsibility in carrying out maintenance work to use all of the resources that we have at our command to reduce expenditures to a minimum and still further increase efficiency. As we have been confronted for the last two or three years with the necessity of getting work done at a cost so much in excess of that prevailing before the war our former measuring sticks have been practically destroyed and it has not been possible for the supervising officers to develop their maximum efficiency.

Supervising officers, in the past, were able to plan their work with a reasonable degree of certainty as to the available supply of labor and material. On many roads programs were planned, based on the general policy of the railroad as a whole and on many others the planning was left to the local officers. A program has the advantage of providing a goal toward which all should strive in carrying on the season's work, and results in a marked saving in the use of labor and material. The possibility of carrying out the plan of the season's work during the past two or three years has been most discouraging, but it is most essential that the former practice be re-established in order that we may again effect the economies that resulted from this practice. It must also be borne in mind by the higher officers that any interference with the program when once established works a serious hardship on the supervisory officer and that the benefits that might be derived from the use of a program can be practically wiped out by repeated changes.

In general it is possible to know about how the expenses of a particular department or sub-division will run by keeping a careful check on the payroll expenditures. Thus by setting up a figure to represent the allowable expenditures for a given period, such as for a week or month, and checking the actual expenditures against those allowable, it is possible to control the expenses by making reductions in force. It can readily be seen that in order to reap the benefit of such a system it is necessary that the amount of the expenditures per week or per month be available within a very few days after the payrolls are prepared, in order that any reductions or increases in force may be made properly and their effect felt in the following payroll. A supervisory officer alive to his responsibilities will have such information readily available.

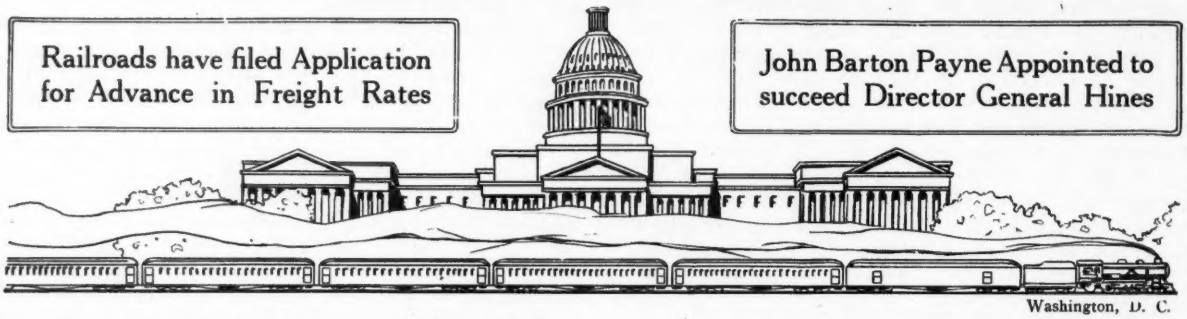
The change in the character of the materials required on a railroad, particularly the increased weight of track and structural materials, makes the question of handling it one of serious concern on the part of those who have to do this work without the aid of some form of labor saving devices. The increased cost of handling such materials, if capitalized, will in the majority of cases warrant a substantial expenditure of money for the purchase of labor saving devices to reduce the number of men required and increase the efficiency of those already employed. The necessity of handling these heavy materials more economically has in many cases resulted in the ingenious supervising officer devising appliances for the purpose which have been commercialized by enterprising manufacturers.

There are many who are inclined to look askance at a new device. In some cases their attitude is "Let some one else develop and perfect its use." There are others who are prejudiced to a great extent and feel that, as they have always done their work with hand labor, it cannot be done as well in any other way. When any of the labor saving devices are placed in the hands of these men, unless something is done on the part of the supervising officer to overcome this prejudice, inferior results are obtained. On the other hand, many roads have not given sufficient attention to the proper maintenance of the machines or to instructing the men. It is only fair to the men that an organization be established for the care of the devices in order that they may be constantly available. In addition, instructions should be given looking to the proper use of such machines with a suitable organization of forces for their most efficient utilization. Even with such an organization we can accomplish very little unless it has the sympathetic cooperation of the foremen. With the use of such devices the difficulty of the supervisory officer in the matter of getting work done satisactorily with inefficient labor will be reduced materially. It has been the experience of many of us to see men who were seriously prejudiced against the use of certain devices, completely change their opinion after the season's work. This is only accomplished by persistent following up and co-operation of the supervisory officer in responsible charge.

Too much attention cannot be given to the necessity of a thoroughly trained and properly organized force for use with all labor saving devices and the supervisory officer can do much toward making successful use of them by showing personal interest and enthusiasm in the results accomplished.

It can be readily seen that an efficient supervisory officer must be a man of broad capabilities and must give constant study and attention to the changes that are taking place in these conditions, and in order to be successful he must be a man of considerable tact, diplomacy and executive ability.

RAILROAD NEWS OF THE NATIONAL CAPITAL


Railroads have filed Application for Advance in Freight Rates
John Barton Payne Appointed to succeed Director General Hines

Washington, D. C.

THE RAILROADS of the country have filed with the Interstate Commerce Commission formal applications for a general advance in freight rates accompanied by estimates of the amount of increased revenue needed to meet increased operating costs and to adjust their income to the basis provided for in the new transportation act. Hearings on the application began at Washington on May 24.

The total increase needed to provide a net return of 6 per cent on the $20,600,000,000 of property investment is estimated at $1,017,000,000, which would be equivalent to an increase in freight rates of about 28 per cent. The applications of the roads were filed by groups, for the Eastern, Southern and Western lines, and the commission has announced its decision to deal with the roads by groups in that way. The commission has decided that it is not necessary to determine the aggregate property value which it will use as a basis for determining the amount of the rate advance in advance of the hearings.

The carriers show that while the basis of operating expenses due to higher wages and increased prices of material and fuel has advanced about 100 per cent, their revenue basis has increased less than 40 per cent, and that it will require now to restore the relation between revenues and expenses an increase of 19.46 per cent. The railroads suggest to the commission, however, that the additional revenue be gained from freight traffic, leaving passenger rates at the present level.

Railroads in Eastern territory estimate the need of an increase of $544,000,000, which is 21.1 per cent of total revenues for 1919, or 30.4 per cent if applied only to freight rates. Southern railroads propose to advance freight rates by 30.9 per cent to provide 20.7 per cent larger revenues or an increase of $120,000,000. The needed freight advance in the West is put at 23.9 per cent to increase all revenues by $353,000,000, or 17 per cent. The need for greater advances east of the Mississippi, the carriers show, is largely due to the effect of standardization of railroad wages and working conditions during the war.

The carriers show that their net income in 1916 was $1,056,000,000, and that in 1919 it fell to $510,000,000, notwithstanding an increased investment in these three years of more than $2,000,000,000. But the carriers point out, if the present level of costs had been in operation throughout 1919 the year's net would have been only $220,000,000, or a little more than 1 per cent on their property investment of $20,616,000,000.

It is understood that the commission is working with the idea of making the rates designed to produce the revenue which it finally decides to allow effective on September 1, when the government guaranty expires, or sooner if possible. After having calculated the amount of revenue needed, a big problem will remain in working out the necessary rate adjustments.

INTERSTATE COMMERCE COMMISSIONERS NOMINATED

President Wilson has sent to the Senate nominations for appointments to the Interstate Commerce Commission to fill the two new positions created by the transportation act and also the vacancy left when Commissioner Harlan's term expired on December 31, 1918, but the Senate has thus far withheld its confirmation. The three appointees are Henry Jones Ford, professor of politics at Princeton University; James Duncan, first vice-president of the American Federation of Labor and president of the Granite Cutters' International Association, and Mark W. Potter, a New York lawyer and president of the Carolina, Clinchfield & Ohio. There has been considerate opposition in the Senate to the first two of these appointments and there has also been a disposition to postpone action on several other appointments made by President Wilson.

APPROPRIATION FOR RAILROAD ADMINISTRATION

Director General Hines' request for an additional appropriation of $420,000,000 to settle up the accounts of the Railroad Administration which have been so far adjusted, was trimmed down by Congress to $300,000,000, and in that form the bill was passed and signed by the President. The reduction in the amount was made by a common congressional practice of postponing or concealing appropriation items to give an appearance of economy and does not affect the result to the Railroad Administration. It was accomplished by directing the War Finance Corporation to take over at par some $90,000,000 of Liberty bonds held by the Railroad Administration and by providing that some $30,000,000 of claims against the Railroad Administration shall be paid out of the revolving fund of $300,000,000 which was appropriated by the Transportation act for loans to railroads. This makes the total of appropriations for the Railroad Administration to date $1,750,000,000, of which about $900,000,000 represents loss and the balance advances to transportation companies which eventually should be paid.

JOHN BARTON PAYNE APPOINTED DIRECTOR GENERAL OF RAILROADS

President Wilson on May 18 issued two proclamations appointing John Barton Payne, Secretary of the Interior, as director general of railroads and also as the agent to be sued for the government on account of transactions growing out of federal control. Judge Payne was general counsel of the Railroad Administration during its first year, resigning to become chairman of the Shipping Board, which he left to accept the cabinet office. It had been generally expected that Max Thelen, director of the Division of Liquidation Claims, would be appointed as Mr. Hines' successor, but the plan was changed for some reason.

Walker D. Hines' resignation as director general of railroads took effect on May 15 and also marks his retirement from the railroad business, as he severed his corporate connections shortly after joining the staff of the Railroad Administration in 1918. Mr. Hines was chairman of the board of the Atchison, Topeka & Santa Fe, and also in private law practice in New York. Mr. Hines has been appointed by the President to act as ararbitrator between various European countries concerned in important questions affecting navigation on the rivers of central Europe which arise under the terms of the peace treaties. These include the question of ownership of vessels formerly under the German and Austrian flags. Mr. Hines will make his headquarters in Paris and he was accompanied by Brice Clagett, who has been assistant to the director general of railroads.

FINANCIAL RELIEF FOR RAILROADS PROPOSED

A suggestion that the $300,000,000 loan fund should be increased in order to enable the railroads to place large orders for equipment was brought forward by a delegation of western shippers who called on the congressional committees to point out the prospects of a serious car shortage, but the plan met with little approval. Railroad executives who were called before the Senate committee on Interstate Commerce suggested that the fund be increased by $500,000,000, saying that with such a loan and with $125,000,000 from the present fund, they could place orders for 100,000 freight cars, 4,000 passenger cars and 2,000 locomotives, but that it was impossible to do much this year on the credit of the individual railroads until the action of the Interstate Commerce Commission on the rate advance case is known. It was explained that 27,000 cars had been ordered this year by the roads that had resources of their own. A committee of investment bankers that was asked to appear before the committee opposed the idea of an additional government appropriation, but joined with the railroads in suggesting amendments to the provision for the $300,000,000 fund in order to make it more available to roads that cannot furnish technical security and to extend the time within which loans must be repaid from 5 to 15 years. This suggestion was adopted by the committee and Senator Cummins on May 13 introduced an amendment extending the period and leaving discretion as to the security in the Interstate Commerce Commission instead of the Secretary of the Treasury. While the committee was unwilling to increase the appropriation, practically the same purpose, so far as the railroads are concerned, would be accomplished by another provision included in Senator Cummins' amendment, which allows the full amount of the indebtedness of the railroads to the government for additions and betterments estimated at $765,000,000, to be funded for ten years, instead of offsetting against it a large part of the rental due the railroads, as Director General Hines had proposed. This would, however, require the Railroad Administration to ask for another appropriation later.

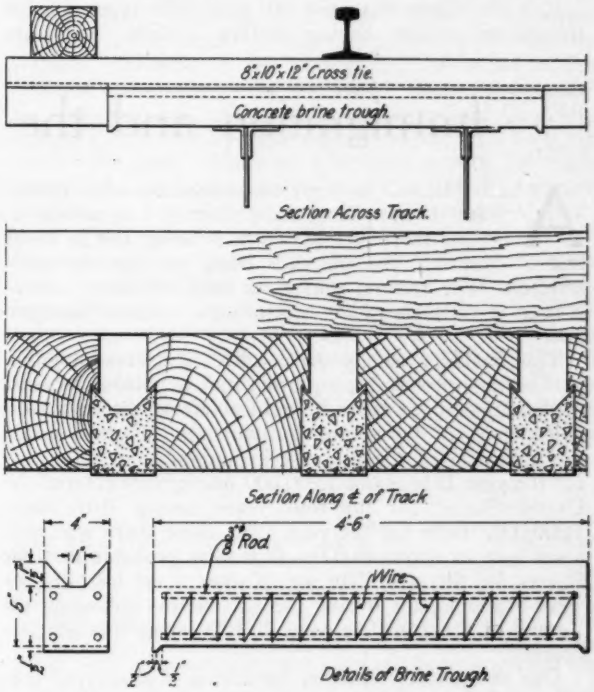
PROPOSED AMENDMENT TO VALUATION ACT

For the purpose of escaping the effect of the Supreme Court's recent decision in the Kansas City Southern valuation case, in which the court held that the Interstate Commerce Commission must comply with that provision of the valuation act directing it to ascertain and report "the present cost of condemnation and damages or of the purchase in excess of original cost or present value" of railroads lands, Senator Cummins on May 3 introduced a bill in the Senate to eliminate that portion of the act. A similar bill has been introduced in the House by Representative Esch.

CONCRETE BRINE TROUGHS FOR BRIDGE DECKS

BY J. E. BEBB,
Assistant Bridge Engineer, Michigan Central, Detroit, Mich.

EVERY BRIDGE ENGINEER and supervisor having in charge the maintenance of open floor steel railroad structures is probably familiar with the action of salt brine upon iron and steel. The rapid deterioration of the metal of bridges under this agency is one of the most difficult problems of maintenance. There is only one real solution, the reinforced concrete ballasted deck with a properly designed drainage system. This remedy, however, is not applicable or practical in many cases. It may not be economy to place an expensive



The Brine Trough and Method of Application

concrete deck upon an old bridge, or the bridge may not be designed to carry the additional load of the concrete floor, this latter condition being by far the most common.

Many remedies have been proposed to eliminate this trouble, and while all may have a certain amount of merit, none has proven satisfactory in all respects. The most common among these is the brine resisting paint, sheet metal shields with gutters and down spouts, and wooden shields, gutters and down spouts. The writer has yet to know of an effective brine resisting paint. Wooden shields decay rapidly and when the wood is rotten afford a favorable condition for a fire. Sheet metal, galvanized or of ingot iron, deteriorate almost as rapidly as structural steel and copper and zinc are prohibitive as to price.

As concrete is the only common structural material not eliminated, the Michigan Central has started a series of experiments with a concrete brine trough or protector, the details of which are shown on the drawing. This concrete unit will fit between the ties of the bridge, each tie being scored on the sides to fit over the trough, the upper edge of the scoring being given a downward pitch to prevent capillarity. Each concrete unit as now made

weighs approximately 75 lb., but the use of slag or cinder concrete will reduce this weight to about 55 lb.

There is no doubt but that the best results in the framing or scoring of the ties will be obtained when this is done at the mill or shop before shipment to the bridge where they will be used. But this same result can be obtained when done in the field by the ordinary bridge carpenter with the usual tools, so that in the conduct of these experiments it has not been found necessary to order specially scored ties, the usual stock tie being used. Great care has been found necessary in the handling of the concrete units just after the removal in the forms to prevent injury to the feather edges of the troughs, since bad nicks will render a trough useless. As soon as the forms are removed each unit is given a thorough rubbing with a carborundum brick.

It is the intention to use this particular type of brine trough on bridges having shallow girders or I-beam stringers, the brine being allowed to drip from the end of each trough at the center of the track. Where, however, the girders or track stringers are of considerable depth and the action of the wind would tend to blow the brine against the girders, it is proposed to use a light reinforced concrete trough, suspended longitudinally from the ties with iron straps. A wooden down spout placed at the end of the trough will carry the brine below the girders.

Sufficient time has not elapsed to form any definite opinion of the serviceability of this scheme. There is no doubt that the trough will carry off and resist the action of the brine satisfactorily, but whether it will stand up under the vibration of the bridge remains to be seen. The idea of the concrete brine trough was conceived by J. S. Huntoon, assistant bridge engineer of the Michigan Central, and it is under his supervision that the experiments are being conducted.

Immigration and the Future Labor Supply

ACCORDING to various authorities the United States is now short about four or five million laborers, the effect of which is being felt in every line of industry, the railroads being perhaps the most affected. The greatest source for unskilled labor such as is used in extra gangs has heretofore been from immigration.

This has been chiefly the result of a decreased immigration, an increased emigration and a natural increase in the demand for labor brought about by the expansion and growth of the country's industries. Figures which are indicative of the decrease in immigration, show that for the year 1914 about 1,200,000 immigrants entered the United States, for the four years ending 1918 about 1,000,000, while for the year 1918 alone there was only a net gain of about 16,000. It is very probable that the figures for the year 1919 would show a net loss, if they were available, for during the six months following the signing of the armistice some 100,000 emigrants left this country.

One of the chief remedies for this is, obviously, to promote the immigration of foreign-born people. This hinges upon our future policy regarding the admittance of immigrants, and is one of the big questions which Congress has yet to settle. Various organizations have appeared advocating policies, some of which are restrictive and some liberal in intent. In general, organized labor wants a restrictive policy which will keep down the influx of unskilled labor during the next few years. On the other side, the Inter-Racial Council has been the prime mover. In advocating a liberal policy the council states that the demand for production far outstrips the labor resources and that the bringing in of a million or so laborers to replenish the present supply would not cause any decrease in the wage scale because of that demand.

At a meeting of the National Conference on Immigration, held under the auspices of the Inter-Racial Council recently, several measures were proposed to relieve the labor shortage. The problems concerned with these measures naturally grouped themselves under the heads of assimilation, admission, stabilization, and naturalization, and were so considered at the conference.

ASSIMILATION OF FOREIGN-BORN RESIDENTS

There are now in the United States several million foreign-born residents who have had practically no educational advantages either in the old country or since coming here. These have necessarily formed their own communities wherever possible, and have been confined in a large measure to the use of their own language. This has been mainly the result of the neglect bestowed upon them from the time of their arrival. Because of this segregation they have not made as desirable an addition to our labor as they might have, had conditions been otherwise.

In attempting to improve this condition, the conference proposed that a Federal Board of Assimilation be established to look after the general welfare of the immigrants. This board will have the duty of co-ordinating all of the existing government activities along this line in order to facilitate the safe and practical distribution of immigrants to points where they will find the class of work for which they are best fitted. The immigrants themselves will be instructed so far as possible in the English language, and in the history, customs and institutions of this country in order that they may become better assimilated into the nation and thus be an uplifting and upbuilding factor of some consequence. The children are to be required to attend school and such immigrants who are not of school age are to be provided with instruction at night schools supported by public funds, or where such facilities are inadequate or lacking, by the industrial establishments in which they are employed. As this is a matter of national concern, it is proposed that the Federal government obligate itself to supervise the education of the immigrant and to appropriate the necessary funds to conduct this work or to assist in its conduction. The disposal of the funds are to be vested in the proposed Federal Board of Assimilation.

CHANGES IN IMMIGRATION LAWS

In order to compete successfully with the countries from which we get our largest supply of so-called unskilled labor, it will of course be necessary to have a constructive immigration policy. The advanced policy advocated by the Inter-Racial Council proposes the continuation in force of the present law except in regard to the literacy test, which test is regarded as not only without merit, but as a direct injury to the interests of commerce, industry, etc. In the hearings before the House Committee on Naturalization and Immigration, it was urged that the present literacy test be eliminated because of the fact that an emigrant may be of great value as an unskilled laborer regardless of his inability to read or write. A constructive policy along this line would thus permit the admission of immigrants who, while without book learn

ing, would be of good character with sound bodies and Old World habits of frugality and industry.

The employment of an adequate number of competent officers was urged as a part of the policy in order that prompt action could be taken with respect to the admission or exclusion of the immigrants and for the proper enforcement of the laws. All hearing relative to their admission or deportation should be public, the immigrant should be allowed to have counsel or other advisers at such hearings and, pending the determination of deportation proceedings, the taking of bail should be authorized. Consular agents should be stationed at foreign points where emigration in large numbers is expected, in order to advise the intending emigrants regarding the requirements of our laws and to otherwise assist both the emigrants and the immigration authorities in this country.

It was brought out at the conference that the immigrants should be encouraged to look upon this country as their permanent home. In order to secure this attitude, a feeling of safety and protection must be implanted in their minds. Among the most demoralizing effects in the past has been the failure of private banks with which the immigrants have deposited money, and by the failure of public authorities to protect their investments. A corrective measure for this was proposed in which it was urged that laws be enacted to provide for safe keeping of funds deposited by the immigrants, and to protect them from extortion, fraud and violence.

While a liberal immigration policy was urged, a naturalization law of higher qualifications was proposed, though the methods to be used were simplified. The present requirements of the English language are to be retained, but the red tape is to be done away with.

In general, the entire movement consists of an attempt to secure proper legislation which will permit the admission of a desirable class of unskilled laborers, either illiterate or literate, a stricter weeding out of undesirable aliens, a better method of assimilating these people into the nation and the raising of a higher standard of citizenship.

A HANDY "STOP" SIGNAL

OF LATE there has been a growing tendency toward the use of old materials, wherever possible, in the construction of needed equipment which was not otherwise available. One of the ingenious devices brought out in this manner is a "stop" signal for use on car repair tracks which was constructed by the foreman in charge of the Michigan Central car repair yard at Jackson, Mich., where over 50 are in use. The accompanying illustration gives a clear idea of the signal in actual operation.

The Signal in Use

It is built from an old pair of blacksmith's tongs by welding to one arm a short rod about three feet in length and forging the other into such a shape that an old chain link slipped down the long arm and over the short end will hold the jaws clamped tightly to the rail. It may be necessary at times to forge the jaws in order to procure a better fit. The end of the welded rod is then flattened and two holes punched or drilled, after which a small square of sheet metal is riveted to it and painted or stenciled to suit the conditions under which it is to be used. If the short arm is properly bent, the signal will be held firmly to the rail.

THE MATERIAL MARKET

THE MATERIAL market is in a peculiar situation; few are inclined to buy and few have anything to sell. It may or may not be a coincidence that the current decrease in the demand for commodities of all kinds has taken place simultaneously with the breaking down of railway transportation as a result of the strike and other conditions which culminated at the end of the second week in May in the appeal to the Interstate Commerce Commission to take over the control of railway traffic.

A decreased demand has been noted in the iron and steel industry, but with 1,000,000 tons of finished steel products loaded on cars that are standing still in the yards of the manufacturers or elsewhere, the supply is still inadequate to meet the present restricted requirements. As a consequence, there has been little change in the prices of steel commodities during the past month with the possible exception of the leveling down of some of the extreme quotations previously noted. There has been little activity in rail, although the Carnegie Steel Company reports that it now has orders up to mill capacity until the end of the year. While no very large orders for track fastenings have been placed, a number of small contracts have served to build up a considerable volume of business. Quotations on steel rails continue at $45 and $47 for Bessemer and open-hearth steel by the United States Steel Corporation and at $55 and $57 by most of the independent companies. The structural steel field is rather quiet, but a notable exception to this has been the awarding the contract for the reconstruction of the Cincinnati Southern Railway bridge over the Ohio river at Cincinnati to the American Bridge Company. Current prices for iron and steel items are given in the table below in comparison with those for a month previous.

	Prices in Cents per Pound			
	April 20		May 20	
	Pittsburgh	Chicago	Pittsburgh	Chicago
Track spikes	3.55 to 4.25	3.82 to 4.52	.... 4.00	3.82 to 4.27
Track bolts	4.90 to 6.00	5.17 to 6.27	....	5.17 to 5.27
Boat spikes	4.25	.... 4.52	.... 4.25	.... 4.52
Angle bars	2.75	.... 2.75	.... 2.75	.... 2.75
Tie plates, steel	....	....	....	2.75 .... 2.75
Tie plates, iron	3.00 to 4.00	.... 3.75	.... 3.75	.... 3.75
Plain wire	3.00 to 3.50	3.27 to 3.77	3.00 to 3.50	3.27 to 3.77
Wire nails	3.25 to 4.00	3.52 to 4.27	3.25 to 4.00	3.52 to 4.27
Barbed wire, galvanized	4.10 to 4.45	4.37 to 4.72	4.10 to 4.45	4.37 to 4.72
C. I. pipe, 6-in. or larger (per ton)	....	77.80	....	.... 76.80
Plates	2.65 to 4.00	2.92 to 4.27	2.65 to 3.50	2.92 to 4.27
Shapes	2.45 to 4.00	2.72 to 4.27	2.45 to 3.25	2.72 to 4.27
Bars (steel)	2.35 to 4.50	2.62 to 4.77	2.35 to 4.00	2.62 to 4.27
Rivets	5.37	5.62	4.50	4.77

The scrap market has been affected even more than new material by the inadequacy of railroad transportation. The prices in the table below indicate some softening from those of a month ago.

	Per Gross Ton	
	Chicago	Cleveland
Relaying rails	$45.00 to $55.00	$50.00 to $55.00
Rerolling rails	31.50 to 32.00	31.50 to 32.00
Rails less than 3 ft. long	28.50 to 29.00	26.00 to 26.50
Frogs and switches, cut apart	23.00 to 23.50	24.00 to 24.50
	Per Net Ton	
No. 1 railroad wrought	26.50 to 27.00	25.50 to 26.00
Steel angle bars	23.50 to 24.00	22.00 to 22.50

The situation in the lumber industry is much the same as with iron and steel. There has been a marked falling off in demand, but lack of transportation has curtailed the supply in the distributing centers. A strike of woodsmen and mill hands in the northern white pine and hemlock districts has been a further factor. The reduced demand for lumber, however, is having more effect on the prices than it is in the iron and steel industry. A comparison of quotations at the present time with those prevailing about March 1 shows a falling off of from $5 to $15 in the various grades and kinds of lumber. The actual prices, however, are still far above those of pre-war times.

Because of a special effort made by the Board of Direction of the American Railway Engineering Association, the assignment of work and membership on the standing committees has been completed a full month earlier than usual so that the committees are afforded 30 days more working time, thereby permitting them that much more time to complete their reports.

The following is a statement of the new subjects assigned to the various committees together with the names of the committee chairmen:

Roadway—Report on the use of corrugated metal culverts in railway work and prepare specifications for material and workmanship; report on sealing bad cracks in rock cuts with the cement gum; the effect of standing water in borrow pits upon the stability of embankments; drainage of long cuts; J. R. W. Ambrose, chief engineer, Toronto Terminals, Toronto, Can.

Ballast—Study and recommend standards for ballast tools, with plans, diagrams, sketches or specifications necessary to illustrate the narrative description; H. L. Ripley, valuation engineer, New York, New Haven & Hartford Railroad, Boston, Mass.

Ties—Methods for installing and keeping records of test sections for obtaining data on the life of cross-ties; the economics of the use of various classes of cross-ties and various kinds of preservative treatment; the relative merits of metal versus wooden ties; F. R. Layng, engineer of track, Bessemer & Lake Erie, Greenville, Pa.

Rail—Recommend sections for rails over 140 lb. per yd.; recommend designs of rail joints covering important dimensions affecting interchange of joint bars; recommend designs for track bolts covering important dimensions, affecting interchange of bolts; report on effect of age on the physical properties of rail steel; G. J. Ray, chief engineer, Delaware, Lackawanna & Western, Hoboken, N. J.

Track—Submit plans and specifications for track tools; study and report on the limit of wear on frogs, including, if possible, rules for determining when frogs are sufficiently worn to warrant removal from track; submit plans and specifications for switch stands, switch lamps and switch locks; submit plans and specifications for tie-plates, derails and anti-creepers, conferring with Committee on Ties and on Rail; study and report on specifications and piece work schedules for contracting track maintenance work; W. P. Wiltsee, assistant engineer, Norfolk & Western, Norfolk, Va.

Buildings—Report on ice houses and icing stations; report on design of freight houses, conferring with Committee on Yards and Terminals; study and report on "Specifications" for buildings for railroad purposes; W. T. Dorrance, designing engineer, New York, New Haven & Hartford, New Haven, Conn.

Wooden Bridges and Trestles—Make detail study of various types of wooden trestles with a view to recommending two or three standards adaptable for general railway use; W. H. Hoyt, chief engineer, Duluth, Missabe & Northern, Duluth, Minn.

Masonry—Report on (a) the effect upon the strength and durability of concrete not having a sufficiency of moisture present throughout the period of hardening, as compared with concrete fully supplied with moisture; (b) methods for providing moisture during this period; (c) remedy for concrete hardened with insufficient moisture; report on methods for conveying and depositing concrete; review and keep advised as to the practical application of specifications relating to design of concrete and reinforced concrete structures as developed by the Joint Committee on Concrete and Reinforced Concrete; J. J. Yates, bridge engineer, Central Railroad of New Jersey, New York City.

Signs, Fences and Crossings—No new assignment; Arthur Crumpton, valuation engineer, Grand Trunk, Montreal, Can.

Signals and Interlocking—Report on colors for signals; W. J. Eck, signal and electrical superintendent, Southern Railroad, Washington, D. C.

Records and Accounts—Recommend forms for recording data for keeping up to date valuation of property of railroads, as required by Valuation Order No. 3—Second Revised Issue; study and report on feasibility of reducing number of forms used in the Engineering and Maintenance of Way Department, combining forms, and simplifying those retained; study and report on the feasibility of reporting engineering data in diagrammatic or graphic form, and submit recommended diagram; H. M. Stout, record engineer, Northern Pacific, St. Paul, Minn.

Rules and Organization—No new assignment; W. C. Barrett, division engineer, Lehigh Valley, Sayre, Pa.

Water Service—Study and report on extent and effect of incrustation in pipe lines and methods for cleaning; study and report on methods of disposing of waste water at water stations and keep track free of ice; study and report on specifications for contracting water service work; study and report on the effect of local deposits on pollution of surface or shallow well water supplies; study and report on specifications for substructures of wood and steel for water tanks; A. F. Dorley, engineer maintenance of way, Missouri Pacific, St. Louis, Mo.

Yards and Terminals—Report on passenger station, freight house and grain weighing scales, conferring with Committee on Buildings; study and report on methods of economic transfer of lading of bad-order cars in large terminals by the introduction of mechanical means or otherwise; B. H. Mann, signal engineer, Missouri Pacific, St. Louis, Mo.

Iron and Steel Structures—Submit specifications for erection of steel railway bridges; prepare specifications for steel highway bridges; report on the electric welding of connections in steel structures, conferring with the Committee on Electricity; O. E. Selby, principal assistant engineer, Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio.

Economics of Railway Location—No new assignment; C. P. Howard, senior civil engineer, Bureau of Valuation, Interstate Commerce Commission, Chicago.

Wood Preservation—Report on practicability of making accelerated tests to develop the comparative values of grades 1, 2 and 3 creosote oil and creosote coal-tar solution as preservative agencies; recommend preservative treatment to be used on piles and timbers in land construction; recommend proper methods for storing lumber and piling for air-seasoning preliminary to preservative treatment; C. M. Taylor, superintendent treating plants, Philadelphia & Reading and Central Railroad of New Jersey, Port Reading, N. J.

Electricity—Study and report on underground conduit construction with a view of preparing plans and specifications for underground conduit and splicing chamber construction for high transmission and power distribution cables, working in conjunction with appropriate committee from the Signal Division and the Telegraph and Telephone Division of the American Railroad Association; Edwin B. Katte, chief engineer, electric traction, New York Central, New York City.

Conservation of Natural Resources—Report on the conservation of human life and energy among engineering employees, conferring with the appropriate committee of the Association of Chief Railway surgeons; report on progress of conservation in Canada; W. F. Ogle, chief draftsman, Chicago, Rock Island & Pacific, Chicago, Ill.

Uniform General Contract Forms—No new assignments; W. D. Faucette, chief engineer, Seaboard Air Line, Norfolk, Va.

Economics of Railway Operation—Recommend methods for increasing efficiency of employees by furnishing them with reports and comparisons planned to inform and interest all concerned; report on the practicability and economy of through routing of solid trains and its effect on the capacity of terminals; L. S. Rose, assistant to general manager, Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio.

Economics of Railway Labor—Study and report on standard methods for performing maintenance of way work with a view to establishing units of measurement of work performed; C. E. Johnston, general manager, Kansas City Southern, Kansas City, Mo.

Shops and Locomotive Terminals—Report on ashpits; engine houses and power plants and shop extension; storehouses; design of car shops; design of coaling stations; typical layouts for storage and distribution of fuel oil, including fuel oil stations between terminals; F. E. Morrow, chief engineer, Chicago & Western Indiana, Chicago.

Special Committee on Standardization—Review at once plans and specifications heretofore adopted and suggest to the Committee on Outline of Work a list of recommendations, the purpose of this being the development of minimum specifications for as many items of standard railway materials as possible, not only in the interest of economy and better materials, but to insure the fullest measure of competition; endeavor to secure the more general use by railways of the specifications, standards, and recommendations of the Association, as a means of saving time and money; submit as suggested work for each committee for the 1921 outline of work definite recommendations for minimum specifications for specified items of standard railway materials; E. A. Frink, principal assistant engineer, Seaboard Air Line, Norfolk, Va.

GENERAL NEWS DEPARTMENT

President Wilson, on May 8, signed the urgent deficiency bill carrying the appropriation of $300,000,000 for the Railroad Administration.

The American Association of Engineers held its sixth annual convention at St. Louis, Mo., on May 10 and 11. Group meetings for engineers in various services were held.

The New York State Barge Canal was opened for business between Buffalo and Troy (practically the entire route) on May 10. The United States War Department proposes to operate nearly 100 barges on this canal, including 20 new self-propelling steel barges of 350 tons capacity.

Operation of the Telegraph and Telephone Companies during the war cost the government $14,005,565, Postmaster General Burleson informed Congress on May 4 in asking an appropriation of that amount to liquidate the affairs of the federal wire administration. According to Postmaster General Burleson, this deficit is the outcome of operations involving gross revenues of over $600,000,000.

An appropriation of $4,693,100 for the Interstate Commerce Commission for the fiscal year ending June 30, 1921, was recommended by the House Committee on Appropriations in reporting the Sundry Civil bill on April 29. This represents a reduction of $651,504 under the appropriation for 1920 because of the closing down of some of the valuation work; and the total is $222,400 less than the commission asked for.

John H. Milburn, office engineer of the Baltimore & Ohio, has been appointed representative of the American Railway Engineering Association on the Advisory Council to the United States Board of Surveys and Maps. This council will be composed of one representative from each of the major engineering associations and will function in behalf of the public with the newly created board of surveys and maps of the federal government.

Nine steel, coal, shipbuilding and transportation companies of Canada have been consolidated into the British Empire Steel Corporation, with a capital of $500,000,000. Included in the consolidation are the following companies and their subsidiaries: the Dominion Steel Corporation; the Nova Scotia Steel & Coal Company, Ltd.; the Canada Steamship Lines, Ltd.; the Canada Foundries and Forgings, Ltd.; the Maritime Rail Company; the Collingswood Shipbuilding Company, Ltd.; the Port Arthur Shipbuilding Company, Ltd.; the Halifax Shipyards, Ltd.; and the Davie Shipbuilding and Repairing Company, Ltd.

The Pension System on the Chicago, Rock Island & Pacific has been in effect for 10 years and the tenth annual report of the pension department discloses some interesting facts. The average age at which employees have been retired and pensioned in 66 years, the pensioners having had an average of 33½ years of service. Of the 464 men who have been pensioned 3 were bridge and building and water service foremen, 9 were bridge and building and water service employees, 37 were section foremen and tie inspectors, 32 were section laborers and 38 were crossing flagmen.

Engineering Council, in a referendum on a National Department of Public Works conducted by the Chamber of Commerce of the U. S. A., voted as follows on the three questions propounded: Shall a department of public works be established by the national government? In favor. Shall a department of public works be established by suitable modification of the existing Department of the Interior, excluding therefrom the non-related bureaus and offices and by change of name from the Department of the Interior to the Department of Public Works? In favor. Shall a department of public works be established by a creation of an entirely new department? Opposed.

The Division of Capital Expenditures of the United States Railroad Administration recently submitted a report giving the total expenditures for additions and betterments during the first 24 months of federal control as $788,628,013. This is hardly more than half of the total amount authorized during 1918 and 1919. The details of these figures are given in the table below:

Authorizations for year, 1918	$ 906,178,538
Expenditures for 1918	473,628,013
Authorizations for year, 1919 (one month estimated)	264,952,630
Estimated expenditures for 12 months, 1919	315,000,000
Authorizations for two years of federal control	1,171,131,163
Expenditures for two years of federal control	788,628,013

The production of steel rails in Canada during 1918, according to a report prepared by the Dominion Mines Department's Mineral Resources and Statistics division, was 162,747 short tons, against 46,645 tons in 1917, and 90,123 tons in 1916. The exports of steel rails during 1918 were 12,952 tons, valued at $575,062, or an average of $44.40 a ton, as compared with exports during the nine months ended December, 1917, of 26,402 tons, valued at $1,605,742, or an average value of $60.82 a ton. The imports of steel rails, according to Canadian Customs records were 7,787 tons valued at $404,717, or an average of $51.93 a ton, against imports in 1917 of 18,160 tons valued at $689,197, or an average of $37.95 a ton. United States trade records show exports of steel rails to Canada of 74,545 tons valued at $3,163,301, or an average of $42.43 a ton during 1918 and 54,088 tons valued at $1,815,768, or an average of $33.57 a ton during 1917.

A. S. T. M. Meeting.—The American Society for Testing Materials will hold its twenty-third annual meeting at Asbury Park, N. J., on June 22 to 25 inclusive, with headquarters at the New Monterey Hotel. The first session will be held at 10 a. m. Tuesday, June 22. Papers and reports will be presented at the various sessions in accordance with the following general outline.

Tuesday morning—Non-ferrous metals.
Tuesday afternoon—Wrought and malleable iron and corrosion.
Tuesday evening—Presidential address and reports of administrative committees.
Wednesday morning—Steel.
Wednesday afternoon—Committee meetings.
Wednesday evening—Testing apparatus.
Thursday morning—Preservative coatings and lubricants.
Thursday afternoon—Miscellaneous committee reports and papers.
Thursday evening—Ceramics.
Friday morning—Road materials, lime and gypsum.
Friday afternoon—Golf tournament.
Friday evening—Cement and concrete.

J. E. Howard will present a paper on "The Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures" on Wednesday morning. The report of the Committee on Preservative Coatings for Structural Materials will be presented on Thursday morning.

The Sectional Committee on Steel Shapes composed of representatives from the American Society of Civil Engineers, the Association of American Steel Manufacturers and other allied organizations, have finished a preliminary report to be used in securing an international standard for rolled steel shapes as used in structures, bridges, railway cars and ships, etc. This is the result of a movement started in 1919 by the British Engineering Standards Association, which undertook to revise its standards and to secure the co-operation of the American Engineering Standards Committee in the possible adoption of Anglo-American standards. Under the auspices of the American body the following organizations were requested to confer on the proposed standardizations: The United States Navy, the Association of American Steel Manufacturers, the American Bureau of Shipping, the American Society of Civil Engineers, the American Railroad Association, the Society of Naval Architects and Marine Engineers, and the Railway Car Manufacturers Association.

PERSONAL MENTION

GENERAL

H. H. Garrigues, engineer maintenance of way of the Southern division of the Pennsylvania Railroad, has been promoted to superintendent of the Delaware division, Eastern region, succeeding **George M. Smith,** transferred. A sketch of Mr. Garrigues appeared in the *Railway Maintenance Engineer* for May, page 209.

Ralph Peters, Jr., assistant superintendent of the Long Island, with headquarters at Jamaica, N. Y., who has been promoted to superintendent-passenger, with the same headquarters, was born at Cincinnati, Ohio, on May 5, 1887, and graduated from Princeton University in June, 1908. He entered railway service as draftsman in the engineering department of the Long Island in 1908, later serving as rodman, transitman and assistant engineer. He was later appointed office engineer in the department of construction and maintenance of way and on August 1, 1916, was transferred to the transportation department for special work. Mr. Peters was appointed assistant trainmaster on May 1, 1917, and on October 1, 1917, became assistant superintendent in charge of operation of the Bay Ridge division, including the Bay Ridge yards. Shortly afterwards his jurisdiction was extended over the passenger operation in the electrified territory. He entered military service on May 1, 1918, serving with the American Expeditionary Forces as lieutenant in the Transportation Corps. After he was discharged from military service Mr. Peters resumed the position he held prior to his service.

Roy Swan Belcher, who was promoted to the position of manager of treating plants, Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., as noted in last month's issue, was born in Stoughton, Mass., January 6, 1883. He spent two years at Lombard College (Galesburg, Ill.) and a year in a course in stenography and bookkeeping. He entered railway service in 1903 as a stenographer in the Chicago, Burlington & Quincy storehouse at Galesburg and about a year later was promoted to lumber clerk in the same department. In 1906 he returned to Lombard College and finished his course in industrial chemistry. Completing this in August, 1907, he obtained a position as chemist in the timber treating plant of the Burlington at Sheridan, Wyo. In 1911 he went to the laboratory of tests of the Burlington at Aurora, Ill., as chemist, but in April, 1912, he resigned to take a position with the Santa Fe as chemist at the treating plant at Somerville, Tex. In September, 1913, he was promoted to the position of chemist to the manager of treating plants at Topeka, Kan., but only held this position about four months when he was made superintendent of the treating plant at Albuquerque, N. M. In April, 1915, he was transferred to the Somerville plant in a like position and held this position until April 1 of this year, when he was promoted to manager of treating plants.

ENGINEERING

J. V. McNab, roadmaster on the Canadian Pacific at Maple Creek, Sask., has been promoted to division engineer, with headquarters at Saskatoon, Sask.

R. Pierce, master carpenter on the Hornell region of the Erie, with headquarters at Elmira, N. Y., has been promoted to inspector of maintenance, with office at Hornell, N. Y.

Harry Slabotsky, assistant superintendent of maintenance of the Louisiana lines of the Southern Pacific, with headquarters at Lafayette, La., has been transferred to the Dallas division, with headquarters at Ennis, Tex. **C. W. Lambert,** roadmaster and engineer of the New Orleans Terminals, has been promoted to assistant superintendent of maintenance of the Louisiana lines, succeeding Mr. Slabotsky.

E. S. Draper, engineer of structures of the Boston & Albany, with headquarters at Boston, Mass., has been appointed principal assistant engineer with the same headquarters, effective May 1, succeeding **L. G. Morphy,** who has resigned to go to South America with the Foundation Company, New York City. The office of engineer of structures has been abolished.

J. W. Graves has been promoted to assistant engineer on the Hornell region of the Erie, with headquarters at Rochester, N. Y. **J. A. Lynch, Jr.,** supervisor, with headquarters at Buffalo, N. Y., has been promoted to office engineer, with headquarters at Hornell, N. Y.

L. C. Miller, office engineer of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been appointed assistant chief engineer in charge of valuation; **R. C. Smith,** assistant engineer at Minneapolis, has been appointed principal assistant engineer, succeeding **F. K. Bennett,** resigned.

R. W. Ross, resident engineer on the Grand Trunk Pacific, with headquarters at Biggar, Sask., has been transferred to Edmonton, Alta., succeeding **R. P. Graves,** resigned. **W. E. Roe,** instrumentman, with headquarters at Edmonton, Alta., has been promoted to resident engineer at Biggar, Sask., succeeding Mr. Ross.

W. F. Miller, division engineer of the Williamsport division, Eastern region of the Pennsylvania Railroad, was transferred to the Baltimore division, succeeding **Franklin Duane,** but has been transferred to Wilmington, Del., succeeding **S. L. Church,** who was transferred to Baltimore, Md. A sketch of Mr. Miller appeared in the May issue, page 207. **N. D. Vernon,** supervisor on the Maryland division, has been promoted to division engineer, succeeding Mr. Miller.

C. J. Frederici, who was promoted to division engineer of the Northern Wisconsin division of the Chicago & North Western, with headquarters at Fond du Lac, Wis., as noted in last month's issue, was born at Auburn, Pa., on March 17, 1881. He graduated from Lehigh University in 1904 and entered railway service in May, 1905, with the Chicago & North Western as a rodman. From 1906 until 1910, Mr. Frederici served as instrumentman, in the latter year being promoted to assistant engineer. In 1917, he was promoted to general bridge inspector, which position he held at the time of his promotion, as noted above.

F. M. Hawthorne, who has been promoted to division engineer on the Logansport division of the Pennsylvania Railroad, with headquarters at Logansport, Ind., as noted elsewhere, was born at Wingate, Ind., on October 8, 1883. He graduated from Purdue University in June, 1905, and entered the employ of the Pennsylvania at Columbus, Ohio. From 1909 until 1917, Mr. Hawthorne served as engineer in charge of construction and in the latter year was promoted to assistant division engineer, in which capacity he served at Louisville, Ky., Terre Haute, Ind., Pittsburgh, Pa., and New Castle, Pa., until March 1, 1920, when he was promoted as noted above.

Thomas L. Doyle, who has been promoted to division engineer of the Mackinaw division of the Pennsylvania, with headquarters at Grand Rapids, Mich., as noted elsewhere, was born at Pottsville, Pa., on September 25, 1879. He graduated from the University of Pennsylvania in 1903 and entered railway service with the Pennsylvania Lines West as an assistant on the engineering corps of the Cincinnati division. He was later transferred to the Richmond division and in 1908 was transferred to the C. & P. division, where he remained until 1913. From 1913 until 1920 Mr. Doyle served as assistant division engineer on the Logansport division, from which position he was promoted to division engineer, as stated above.

Joseph P. Menard, assistant to the division engineer maintenance of way of the Eastern Lines of the Grand Trunk, with headquarters at Montreal, Que., has been promoted to assistant engineer, Montreal division, with the same headquarters. Mr. Menard was born at Les Cedres, Que., on April 13, 1881. He entered the employ of the Canadian Pacific in January, 1905, being promoted in 1907 to assistant engineer on location and assistant to the division engineer of construction of the Transcontinental Railway, now a part of the Canadian National. From 1908 to 1913 he served as resident engineer on that road, leaving it in 1914 to go as resident engineer on the Glengarry & Stormont, a subsidiary of the Canadian Pacific. In 1916 he went into private practice, but

returned to the Canadian Pacific in 1917 as assistant engineer of the Montreal terminals. In 1918 he left the Canadian Pacific and entered the employ of the Grand Trunk as an assistant to the division engineer of maintenance of way of the Eastern Lines, from which position he was promoted to assistant engineer of the Montreal division, as stated above.

H. L. Ripley, corporate chief engineer of the New York, New Haven & Hartford, has been appointed corporate and valuation engineer of the Central New England.

J. C. Schwaab, assistant engineer in the valuation department of the Chicago & Alton, with headquarters at Chicago, has resigned to become city engineer of Alton, Ill.

J. Q. Barlow, consulting engineer at San Francisco and formerly assistant chief engineer on the Southern Pacific, has been appointed regional engineer Railroad Administration, with headquarters in San Francisco.

Norman B. Pitcairn, division engineer on the Pennsylvania, with headquarters at Pittsburgh, Pa., has been transferred to the Middle division, with headquarters at Altoona, Pa., succeeding **W. E. Brown,** promoted to assistant chief engineer maintenance of way of the Central region, with headquarters at Pittsburgh, Pa. **S. E. Holland,** supervisor on the Middle division, with headquarters at Newport, Pa., has been promoted to division engineer of the newly created Wheeling division of the Central region.

George E. Righter, valuation pilot on the Erie, has been promoted to assistant division engineer, with headquarters at Hornell, N. Y. Mr. Righter was born at Newark, N. J., on July 2, 1889, and entered the employ of the New York Central & Hudson River as a rodman at Syracuse, N. Y., in June, 1906, leaving that road in 1907. From 1907 to the end of 1908 he was employed by J. G. White & Co. as a rodman and levelman on railroad construction work in Porto Rico, returning to New York in the early part of 1909, where he became connected with the New York State Water Supply Commission. In February, 1910, he returned to railroad service with the Erie and has served successively as transitman, assistant engineer, supervisor and valuation pilot until his recent promotion to assistant division engineer, as noted above.

R. F. Nicholson, transitman on the Grand Trunk System, with headquarters at Portland, Me., has been promoted to assistant engineer with the same headquarters. Mr. Nicholson was born on July 2, 1892, at London, England, and attended the London Polytechnic and Central Technology College of England. In August, 1911, he moved to Canada and entered the employ of the Canadian Pacific as a rodman at Vancouver, B. C. In 1913 he became a rodman on the Esquimalt & Nanaimo at Union Bay, Victoria, B. C., leaving that road to go with the Pacific & Great Eastern as a draftsman at Vancouver and Lillooct, B. C. He left railway work in the beginning of 1915, but returned in 1918 to enter the services of the Grand Trunk as transitman, remaining in this position until his recent promotion to assistant engineer, as noted above.

T. B. Whitney has been promoted to office engineer of the New York region of the Erie, with headquarters at New York. **H. A. Lloyd,** assistant to the superintendent of maintenance, has been appointed maintenance of way inspector, with headquarters at New York; **S. J. Malloy,** assistant division engineer, with headquarters at Jersey City, N. J., has been promoted to division engineer, with the same headquarters. **F. B. Kronauer** has been promoted to assistant division engineer, with headquarters at Jersey City, N. J., succeeding **R. G. Wilson,** who has been transferred to the Wyoming division, with headquarters at Dunmore, Pa., vice **H. D. Row,** transferred.

O. T. Nelson, who has been appointed chief engineer of the Atlanta & West Point, the Georgia Railroad and the Western of Alabama, with headquarters at Atlanta, Ga., as noted in the *Railway Maintenance Engineer* for April, spent about nine years in railroad construction work prior to entering railroad service. He entered the employ of the Mobile & Ohio as supervisor of track at the age of 26 and was appointed roadmaster of the Southern nine years later. Later he went to the Georgia as superintendent maintenance of way, serving in the same capacity for the West Point Route, now part of the Atlanta & West Point. He was then elected vice-president and general manager of the Elberton & Eastern and the Washington & Lincolnton, which position he held when the railroads were placed under federal control. During federal control Mr. Nelson served as engineer maintenance of way of the roads mentioned above and others.

E. R. Logie, resident engineer of the Canadian National Railways, with headquarters at Rosedale, Ont., has been promoted to division engineer of the Superior division, with headquarters at Hornepayne, Ont., succeeding **H. K. Morrison,** who has been transferred to the Montreal division, Quebec district, with headquarters at Montreal. **S. H. Sykes,** assistant to the chief engineer of the Eastern lines of the Canadian Northern at Toronto, has been appointed district engineer of the Canadian National Railways, with headquarters at Vernon, B. C., in place of **Major W. G. Swan,** who resigned recently to become chief engineer of the Vancouver Harbor Commission.

C. A. Daley, assistant division engineer on the Erie, with headquarters at Elmira, N. Y., has been promoted to division engineer, with headquarters at Salamanca, N. Y. Mr. Daley was born at Angelica, N. Y., on September 3, 1886, and graduated from Purdue University in 1910. In June of that year he entered the employ of the Pittsburg & Shawmut as inspector, and in February, 1911, was made engineer on that road, with headquarters at Kittanning, Pa. In August, 1911, he left that road to go with the Cape Cod Canal Construction Company as a transitman at Sandwich, Mass., leaving in the following September, to become an inspector for the Keith Car Company at Sagamore, Mass. From February, 1913, to September, 1914, he was general foreman and supervisor on the Pittsburg, Shawmut & Northeren at St. Marys, Pa., entering the employ of the Erie on the latter date as a transitman at Hornell, N. Y. In February, 1916, he was promoted to assistant engineer at Rochester, N. Y., and again to assistant division engineer at Elmira, N. Y., in the following May, remaining in this position until his recent promotion to division engineer, as noted above.

C. A. Daley

Franklin Duane, division engineer on the Pennsylvania Railroad, with headquarters at Baltimore, Md., has been promoted to engineer maintenance of way of the Southern division, with headquarters at Wilmington, Del., succeeding **H. H. Garrigues,** promoted to superintendent of the Delaware division, as noted elsewhere. Mr. Duane was born at Trenton, N. J., on September 1, 1862, and graduated from Princeton University in 1883, entering railway service in the engineering department of the Pennsylvania in November of that year. On October 1, 1888, he was promoted to assistant supervisor on the Monongahela division, being transferred to the Middle division and later to the New York division, where he remained until September, 1893, when he was promoted to supervisor of signals on the Philadelphia Terminal division. He was later promoted to supervisor on the Amboy and New York divisions, remaining at this work until January 1, 1895, when he was promoted to division engineer of the Delaware division. He subsequently served on the Maryland and Baltimore divisions, where he remained in this position until his recent promotion to engineer maintenance of way, as noted above.

F. M. Hawthorne, assistant division engineer on the Pennsylvania Lines at Newcastle, Pa., has been promoted to division engineer on the Pennsylvania Railroad, Northwestern region, Logansport division, with headquarters at Logansport, succeeding **W. E. Guignon,** who has been transferred

to the Eastern division of the Eastern Ohio division, Central region, with headquarters at Canton, Ohio. **E. G. Johnston,** assistant division engineer at Pittsburgh, Pa., has been promoted to division engineer of the Mansfield division, with headquarters at Mansfield, Ohio. **T. L. Doyle,** assistant division engineer, with headquarters at Logansport, Ind., has been promoted to division engineer of the Mackinaw division, with headquarters at Grand Rapids, Mich. **R. C. Miller,** division engineer, with headquarters at Terre Haute, Ind., has been transferred to the Chicago Terminal division, with headquarters at Chicago. **C. L. Barnaby,** division engineer on the Grand Rapids & Indiana, with headquarters at Grand Rapids, Mich., has been transferred to the Ft. Wayne division, with headquarters at Ft. Wayne, Ind. **W. R. Triem,** assistant engineer, with headquarters at Akron, Ohio, has been promoted to assistant division engineer of the Logansport division, with headquarters at Logansport, Ind., succeeding Mr. Doyle. **W. F. Renz** has been appointed assistant division engineer of the Grand Rapids division, with headquarters at Ft. Wayne.

H. D. Row, whose appointment as division engineer of the Cincinnati division of the Erie, with headquarters at Marion, O., was noted in last month's issue, was born at Galion, O., on November 8, 1888. He received his education at the Ohio State University and entered railway service in June, 1906, with the Erie as a clerk to the track supervisor. From June, 1907, until September, 1907, he served as rodman, leaving the Erie at the latter date to attend the Ohio State University. In June, 1912, he returned to the Erie, working on track work during the construction of the yard terminal at Marion, O. He was appointed assistant division engineer of the Cincinnati division in August, 1912, latter being transferred to assistant engineer in the general office at Cleveland. From February, 1916, until April, 1918, he served as track supervisor of the Meadville division, being appointed assistant division engineer of the Delaware & Wyoming division at the latter date. Mr. Row was transferred to the Kent division on February 1, 1920, remaining on this division until April 1, when he was appointed division engineer, as noted above.

H. D. Row

James H. Lynch, Jr., chief of corps on the Erie, has been promoted to office engineer, with headquarters at Hornell, N. Y. Mr. Lynch was born at Corning, N. Y., on February 6, 1897, and was graduated from Cornell University in 1919. He entered the employ of the Erie in the maintenance of way department during the summer season of 1914 as timekeeper in an extra gang, continuing in this work during the summers of 1915 to 1918, inclusive. After graduating in 1919 he entered railway service with the same road on July 3 of the same year, as assistant foreman on the Black Rock, N. Y., section. From this position he was successively promoted to rodman, levelman, transitman and chief of corps, remaining in this position until his recent promotion to office engineer, as noted above.

Daniel K. Van Ingen, who has been appointed division engineer of the Black Hills division of the Chicago & North Western, with headquarters at Chadron, Neb., as noted in last month's issue, was born at Poughkeepsie, N. Y., on August 3, 1878. He graduated from Rensselaer Polytechnic Institute in June, 1900, and entered the employ of the Chicago & North Western as tapeman and rodman in Iowa. From March, 1902, until December, 1902, he was employed as transitman and acting locating engineer on the Choctaw, Oklahoma & Gulf, leaving this load at the latter date to go with the White River Railway in Arkansas as division engineer on construction work. In April, 1903, he went to the New York Central & Hudson River as assistant engineer on maintenance, construction and general work in connection with improvements, later being promoted to assistant district engineer at Syracuse, N. Y., in charge of construction. He returned to the Chicago & North Western in January, 1910, as assistant engineer in charge of construction and valuation work, in which capacity he served until August, 1914, when he was appointed assistant field engineer with the Interstate Commerce Commission, Central district, later being promoted to field engineer. In May, 1919, he again returned to the Chicago & North Western as assistant engineer in the office of the corporation, which position he held at the time of his appointment, as noted above.

J. A. S. Redfield, whose promotion to assistant engineer of maintenance of lines west of the Missouri river of the Chicago & North Western, with office at Omaha, Nebr., was noted in last month's issue, was born at Santa Barbara, Cal., on December 29, 1875. He graduated from Rensselaer Polytechnic Institute in 1898 and entered the service of the Chicago & North Western. From 1900 until 1908 he served as assistant engineer on second track construction in Iowa, on the location and construction of new lines and on Chicago track elevation work. In 1908 Mr. Redfield was promoted to division engineer, in which capacity he served on various divisions until his appointment as resident engineer on new construction, which position he held at the time of his promotion, as noted above.

TRACK

J. R. Stam, supervisor on the Pennsylvania, with headquarters at Blairsville, Pa., has been transferred to Baltimore, Md., succeeding **J. Schimmel, Jr.,** who has resigned.

W. H. Woltemate has been appointed supervisor on the Harrisburg division of the Philadelphia & Reading, with headquarters at Boiling Springs, Pa., succeeding **O H. Rhoads,** who has been transferred to Reading, Pa.

C. O. Hooper has been appointed roadmaster and engineer of the New Orleans Terminals of the Southern Pacific, with headquarters at New Orleans, succeeding **C. W. Lambert,** promoted, as noted elsewhere.

R. A. Harlow, instrumentman on the Grand Trunk Pacific, has been promoted to roadmaster on the territory between Pacific and Prince Rupert, with headquarters at Prince Rupert, B. C., in place of **O. Carlson,** who was granted a leave of absence on account of sickness.

C. S. Hager, supervisor of the Allegheny division of the Pennsylvania Railroad, with headquarters at Reynoldsville, Pa., has been transferred to the Middle division, with headquarters at Newport, Pa., succeeding **S. E. Holland,** promoted as noted elsewhere.

A. M. Bird, roadmaster on the Canadian Pacific at Kingston, Ont., has been transferred to Brownville Junction, Me., where he has the Moosehead subdivision, covering a line between Megantic and Kylehead, on the New Brunswick district. **J. Daem,** roadmaster at Empress, Alta., has been transferred to Maple Creek, Sask., in place of **J. V. McNab,** promoted, as noted elsewhere.

W. A. Dibble has been promoted to supervisor of track on the New York Central, Lines West, with headquarters at La Porte, Ind., effective April 16, in place of **F. M. Rummel,** deceased. Mr. Dibble was born at Angola, N. Y., on August 16, 1886, and entered railway service with the New York Central on April 1, 1904, as timekeeper in the track department. From November 1, 1906, until June 1, 1911, he served as clerk to the supervisor of track. He was promoted to extra gang foreman on June 1, 1911, which position he held until May 1, 1916, when he was appointed assistant supervisor of tracks at Elkhart, Ind., later being transferred to La Porte, Ind., retaining the latter position until his promotion as noted above.

John Bristow, whose promotion to supervisor of track of the Saginaw-Bay City Terminal of the Pere Marquette, with headquarters at Saginaw, Mich., was noted in last month's issue, was born in England on July 26, 1869. He entered railway service with the Michigan Central on November 12, 1893, as a section laborer. On July 8, 1897, he went to the Flint &

Pere Marquette as a section laborer and was promoted to section foreman on October 17, 1898. On March 13, 1916, Mr. Bristow entered the employ of the Dow Chemical Company as general foreman in its plant at Midland, Mich. He returned to the Pere Marquette on April 30, 1919, as an extra gang foreman and was promoted to assistant supervisor of track on August 11, 1919, which position he held at the time of his recent promotion.

H. Rhoads has been appointed acting roadmaster on the Minnesota division of the Illinois Central, with headquarters at Dubuque, Ia., succeeding **J. S. McNamara,** who has been granted leave of absence because of sickness.

J. H. Thomas, supervisor on the Hornell region of the Erie, with headquarters at Dunmore, Pa., has been transferred to the New York region, with headquarters at Bradford, Pa., succeeding **G. C. Metzger,** who has been transferred to Dunmore, Pa., in place of **L. S. Weaver,** transferred.

William Pulford, extra gang foreman on the Grand Trunk, has been promoted to supervisor of track, with headquarters at Guelph, Ont. Mr. Pulford was born at Lincolnshire, England, on November 30, 1870. He entered the employ of the Hamilton North Western, now part of the Grand Trunk, in 1886, being later promoted to section foreman on the Barrie division. In 1904 he was made extra gang foreman, remaining in this position until his recent promotion to supervisor of track, as noted above.

Thomas J. Harney, whose promotion to roadmaster on the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., was announced in the May issue of the *Railway Maintenance Engineer*, was born at Pocono Summit, Pa., on June 23, 1878. He entered the service of the Lackawanna in April, 1888, and served consecutively as water boy, section laborer and trainman, being promoted to section foreman in 1900. In 1902 he was made extra gang foreman and eight years later was promoted to supervisor, remaining in this position until he was promoted to roadmaster.

H. B. Butterfield has been promoted to track supervisor on the Central New England, with headquarters at White Plains, N. Y., succeeding **J. P. Crilley.** Mr. Butterfield was born at Stafford Springs, Conn., on January 25, 1891, and entered railway service on September 5, 1911, with the Central New England as a rodman in the engineering department, being stationed at Hartford, Conn. He was subsequently promoted to transitman at Poughkeepsie, N. Y., and later to assistant engineer at Danbury, Conn., which position he held until he was promoted to track supervisor with headquarters at Pine Plains, N. Y.

BRIDGES AND BUILDINGS

H. H. Van Houten, assistant master carpenter of the New York region of the Erie, has been promoted to master carpenter, with headquarters at Jersey City, N. J.

Marvin G. Tribe, who has been promoted to master carpenter on the Erie, with headquarters at Elmira, N. Y., succeeding **R. Pierce,** promoted, as noted elsewhere, was born at Tioga Center, N. Y., on April 4, 1892. He entered the service of the Erie in July, 1916, at Elmira, N. Y., where he served as a carpenter until May, 1917, when he was promoted to painter foreman. In October, 1917, he was promoted to carpenter foreman, and again in November, 1918, to assistant master carpenter, remaining in this position until his recent promotion to master carpenter. Throughout his entire work with the Erie Mr. Tribe has remained at Elmira, N. Y.

William H. Matthews has been promoted to master carpenter on the Erie, with headquarters at Salamanca, N. Y. He was born at Collins, N. Y., on September 20, 1859. He entered the employ of the Erie on May 1, 1876, at Jamestown, N. Y., as a carpenter, being transferred to Gowanda, N. Y., in 1886. He was made foreman carpenter at Gowanda in March, 1896, and on September 15, 1907, was promoted to master carpenter on the Susquehanna division at Hornell, N. Y. Ten years later he was made assistant master carpenter of the Allegheny and Bradford divisions, with headquarters at Salamanca, N. Y., from which position he was promoted to master carpenter of the Allegheny division, with the same headquarters as stated above.

SUPPLY TRADE NEWS

GENERAL

The Grip Nut Company, Chicago, has opened a new plant at 5917 South Western avenue, Chicago.

The Ingersoll-Rand Company, New York, reports the sale to the Lehigh Valley of 25 "Little David" pneumatic rail-bonding outfits.

Page Steel & Wire Company has removed its offices from 30 Church street, New York, to the offices of the American Chain Company, Grand Central Terminal, with which it has been consolidated.

The Yale & Towne Manufacturing Company has removed its general offices from New York to Stamford, Conn. The company maintains an office in New York City, but all communications should be sent to Stamford.

The R. W. Young Manufacturing Company, electric turntable tractors, electric hoists and cranes, announces its removal from 80 East Jackson boulevard to the Harris Trust building, 111 West Monroe street, Chicago.

The name of the Madden Company has been changed to Maintenance Equipment Company. The organization and character of business remains the same as before and the headquarters will continue in the Railway Exchange Building, Chicago.

K-G Welding & Cutting Company, 556 West Thirty-fourth street, New York, manufacturers of welding and cutting apparatus, has opened a sales office at 12 and 14 East Harrison street, Chicago. **William McCarthy,** who has been in charge of the railroad service department, has been appointed western sales manager.

PERSONAL

B. H. Forsyth, salesman for the Grip Nut Company, Chicago, has been appointed manager of the Pittsburgh office of the Chisholm-Moore Manufacturing Company, Cleveland, O.

William B. Ross, district manager in charge of sales for Mudge & Co., Chicago, with headquarters at New York City, has been appointed manager of sales of Edwin S. Woods & Co., Chicago.

George E. Long, senior vice-president of the Joseph Dixon Crucible Company, Jersey City, N. J., has retired after 43 years' service with this organization. Mr. Long entered the employ of this company as a stenographer and advanced through the positions of secretary and treasurer to that of vice-president.

John Wesley Hyatt, inventor of the Hyatt roller bearing, died on May 10 at his home in Short Hills, N. J., at the age of 83. Mr. Hyatt was not connected with the Hyatt Roller Bearing Company, having sold the patent for this invention about 25 years ago.

E. G. Lewis, manager of the Cleveland office of the Bucyrus Company, has been appointed central sales manager of that company, with headquarters in the McCormick building, Chicago, succeeding **E. C. Hingston,** resigned. Mr. Lewis will continue to have jurisdiction over the Cleveland office.

Paul Kircher, resident manager of the eastern territory for the Massey Concrete Products Corporation, with headquarters at New York City, has been made resident manager, with office in Chicago, in charge of the sale of the reinforced concrete poles manufactured by this company by the centrifugal process. Mr. Kircher will continue his duties as resident manager of the Concrete Products Corporation, Ltd.

Sereno P. Fenn, vice-president of the Sherwin-Williams Company, Cleveland, Ohio, upon the completion of his fiftieth year of service with that company was the guest of honor at a complimentary dinner given on April 1 at the Hollenden Hotel, Cleveland, by the Sherwin-Williams Company, its directors, officers, Get-together Club, Foreman's Club and Long Service Employees. Mr. Fenn has served in

various capacities with this company, principally as cashier, treasurer and vice-president, since April 1, 1870.

G. E. Lemmerich, railroad layout engineer for the Austin Company, Cleveland, Ohio, died recently of heart failure.

Colonel Edward B. Richardson, formerly of Richardson & Hale, consulting engineers, and **Harry Gay,** who for the past nine years was in the Boston office of Stone & Webster, division of construction and engineering, have organized the firm of Richardson & Gay, consulting engineers, 220 Devonshire street, Boston, Mass.

The Sullivan Machinery Company, Chicago, Ill., has undertaken an educational campaign with the aid of moving picture films which will be shown throughout the country. These films depict the manufacture of the Sullivan products, more especially the pneumatic tool and quarrying equipment, and also illustrate the actual use of the various devices by the purchasers.

Luis G. Morphy, principal assistant engineer of the Boston & Albany, has resigned to take a position with the Foundation Company, New York City, as its representative in South America, and sailed on May 5 for Lima, Peru. Mr. Morphy was born in Orizaba, Mexico, on December 4, 1876, and graduated from Rensselaer Polytechnic Institute in 1900. He began railway service on the New York Central at Albany, N. Y., and went to Boston in 1907 as assistant engineer of maintenance of way.

TRADE PUBLICATIONS

Air Compressors.—The National Compressed Air Machinery Company, San Francisco, Cal., has recently published bulletin No. 20 describing the construction of a vertical type air compressor and containing a table of dimensions and specifications of the various models built by this company.

Forms for Roads and Streets.—A 44-page bulletin has been issued by the Blaw-Knox Company of Pittsburgh, Pa., to illustrate and describe the application of special Blaw forms for concrete pavements, sidewalks, curbs, etc., a number of the forms being distinctly applicable to railway station platforms, curbings, etc.

CONSTRUCTION NEWS

The Atchison, Topeka & Santa Fe is completing plans for the construction of a number of buildings at its mechanical terminal at Albuquerque, N. M. In addition to the buildings completed before the war, a machine shop, 240 ft. by 600 ft. of steel frame construction; a babbitt shop, 36 ft. by 50 ft.; a flue shop, 46 ft. by 96 ft.; a waste cleaning and paint shop, 24 ft. by 60 ft.; a cab painting and asbestos shop, 30 ft. by 112 ft.; a fire department building, 40 ft. by 60 ft.; a pattern shop, 40 ft. by 70 ft., and a tin shop, 24 ft. by 42 ft., will be constructed. The main buildings are to be principally of reinforced concrete.

The Canadian National Railways are preparing to construct a new bridge across the St. Johns river at Fredericton, N. B., on which work will probably be started some time this year. This work will call for an expenditure of approximately $2,000,000.

The Canadian Pacific will carry out improvements at the Angus shops in Montreal, Que., at a cost of about $1,000,000, as follows: Extensions to the locomotive shops to give an additional floor area of 58,000 sq. ft.; an extension to the freight car shop, 106 ft. by 400 ft.; an extension to the pattern shop, 50 ft. by 75 ft.; three extensions to the passenger car shops, one of 102 ft. by 161 ft., another of 137 ft. by 161 ft., and a third 137 ft. by 239 ft.; a new electrical shop, 62 ft. by 362 ft.; a planing mill shelter, 126 ft. by 144 ft.; four new stalls added to the dry kiln increasing the area 7,400 sq. ft.; a new heavy service tapered floor scale; a number of track changes and additions in the yard; a mechanical coaling plant and a new standpipe.

The Lake Erie & Northern and Grand River Railway, subsidiary lines of the Canadian Pacific, operated by electricity, have authorized improvements and betterments to be carried out this year. Contracts have already been let for two line revisions, one at Kitchener and the other at Galt, Ont., also for an addition to the repair shop at Preston, Ont., and for two fireproof sub-stations, one at Preston and the other at Brantford.

The Oklahoma Southwestern has now completed about 33 per cent of its new line from Bristow, Okla., through Youngstown and Flick to Okmulgee, a distance of approximately 50 miles. The maximum grade on this line is 0.7 per cent and the maximum curvature 6 deg. The structures consist of one 50-ft. girder span and about 2 miles of timber bridging. Contracts for the construction were let to the Allhands & Davis Company, Rogers, Ark., on March 1. The grading averages about 15,000 cu. yd. per mile. In addition to the construction now under way the company contemplates the extension of its line from Okmulgee to a point on the Red River in Jefferson county, a distance of about 200 miles. The line now under construction will connect at Okmulgee with the St. Louis-San Francisco and the Okmulgee Northern.

The Pennsylvania Offices Corporation will erect a new four-story building, 73 ft. by 100 ft., on Wells street, between Jackson and Van Buren streets, Chicago, which will be leased to the Pennsylvania Railroad for 10 years at a net term rental of $100,000. The estimated cost of this building, which will house all the general offices of the lines at Chicago, except the ticket offices, is approximately $350,000, and it is expected that it will be ready for occupancy by August 1.

The Southern Railway System will replace the superstructure of the existing Cincinnati Southern bridge across the Ohio river at Cincinnati, Ohio, by new double track trusses, a contract for the fabrication and erection of the steel structure having been let to the American Bridge Company.

The Wabash has awarded contracts for the fabrication and erection of a bascule bridge over the River Rouge at Detroit, Mich., which it is expected will be in operation in the spring of 1921. The American Bridge Company, New York City, obtained the contract for the steel work and machinery; the Kansas City Bridge Company, Kansas City, Mo., will erect the steel work and machinery and dismantale the present superstructure, and the J. W. McMurry Contracting Company, Kansas City, Mo., will have charge of the masonry work and removal of the present substructure. The proposed structure is a single trunnion bascule bridge with double track, providing a clear navigating span of 125 ft., and is to be operated by electricity with an auxiliary operating plant using a gasoline engine. The foundation piers carrying the trunnion will be of concrete, carried to bed rock, and the rest pier supporting the end of the bridge is to be carried on a pile foundation. The bridge will be erected in a vertical position so as not to interfere with the use of the present bridge.

EQUIPMENT AND SUPPLIES

The Baltimore & Ohio has ordered 300 tons of fabricated bridge steel from the American Bridge Company.

The Boston & Maine has ordered 200 tons of fabricated bridge steel from the American Bridge Company.

The Forbes-Perkins Company, Rodney D. Chipp, New York manager, 120 Liberty street, is in the market for 20 ballast cars of 40 tons' capacity and 20 ballast cars of 30 tons' capacity.

The Netherlands Government is in the market for 14,000 tons of 50 and 70-lb. rails for use on the State Railways in Java.

The Norfolk & Western has ordered 600 tons of fabricated bridge steel from the American Bridge Company.

The Oliver Iron Mining Company, Duluth, Minn., has ordered from the Magor Car Company 65 air dump cars of 30 cu. yd. capacity for the Missabe Range.

The Southen Pacific has ordered 250 ballast cars from the Mt. Vernon Car & Manufacturing Company.

The United Fruit Company is in the market for 2,550 tons of 50-lb. rails, also for 1,000 tons of 30-lb. rails, for use on its railroads in Honduras.